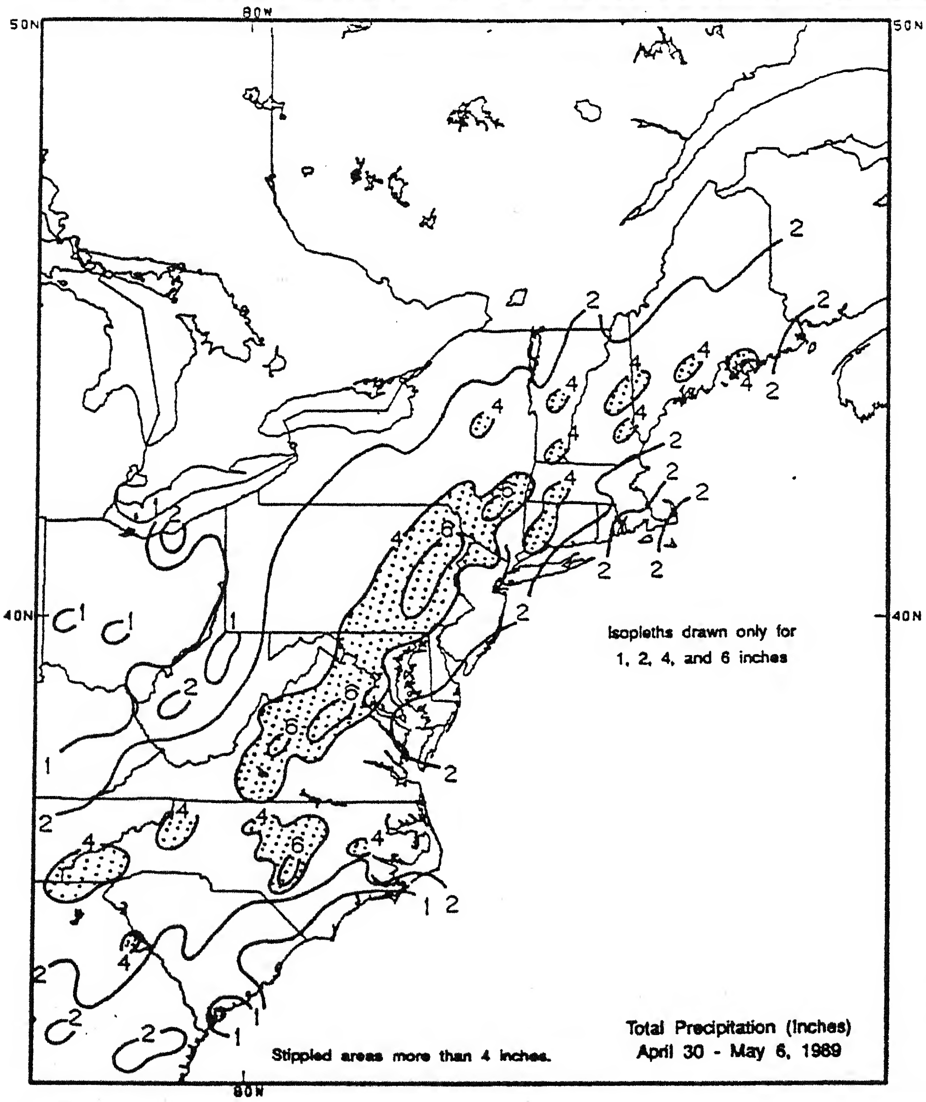
CONTAINS:
SPECIAL ON EXTREME DRYNESS IN TURKEY

CLIMATE ANALYSIS CENTER

CONTAINS:
UNITED STATES APRIL '89 CLIMATE REVIEW

WEEKLY CLIMATE BULLETIN

No. 89/18 **Washington, DC** **May 6, 1989**



Total Precipitation (Inches)
April 30 - May 6, 1989

HEAVY RAINS (UP TO 7.0 INCHES) FELL ALONG MUCH OF THE EASTERN SEABOARD LAST WEEK AND PROVIDED SOME RELIEF FROM LONG-TERM DRYNESS IN NEW ENGLAND. THIS WAS THE FIRST SIGNIFICANT, WIDESPREAD WEEKLY PRECIPITATION IN THE NORTHEAST SINCE LAST NOVEMBER. CONTAINED IN THIS ISSUE IS THE APRIL 1989 U.S. CLIMATE REVIEW (PAGES 11-18), ALONG WITH A SPECIAL CLIMATE SUMMARY ON THE LONG-TERM DRYNESS THROUGHOUT MOST OF TURKEY AND ADJACENT REGIONS (PAGES 19-22).

UNITED STATES DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL WEATHER SERVICE - NATIONAL METEOROLOGICAL CENTER

WEEKLY CLIMATE BULLETIN

This Bulletin is issued weekly by the Climate Analysis Center and is designed to indicate, in a brief, concise format, current surface climatic conditions in the United States and around the world. The Bulletin contains:

- Highlights of major climatic events and anomalies.
- U.S. climatic conditions for the previous week.
- U.S. apparent temperatures (summer) or wind chill (winter).
- Global two-week temperature anomalies.
- Global four-week precipitation anomalies.
- Global monthly temperature and precipitation anomalies.
- Global three-month precipitation anomalies (once a month).
- Global twelve-month precipitation anomalies (every 3 months).
- Global three month temperature anomalies for winter and summer seasons.
- Special climate summaries, explanations, etc. (as appropriate).

Most analyses contained in this Bulletin are based on preliminary, unchecked data received at the Center via the Global Telecommunication System. Similar analyses based on final, checked data are likely to differ to some extent from those presented here.

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GLOBAL CLIMATE HIGHLIGHTS

MAJOR CLIMATIC EVENTS AND ANOMALIES AS OF MAY 6, 1989

1. Coastal sections of British Columbia and Alaska:

STILL DRY.

Generally less than 27 mm of precipitation was reported at most stations as very dry conditions persisted [11 weeks].

2. Central United States:

DRYNESS RETURNS.

Little or no precipitation fell in much of the center of the country as the dryness resumed (See U.S. Weekly Climate Highlights) [7 weeks].

3. Southern and Eastern United States:

HEAVY RAINS OCCUR.

As much as 302 mm of rain was measured at stations in the South and along the Atlantic Coast (See U.S. Weekly Climate Highlights) [Episodic Event].

4. Argentina:

MORE RELIEF.

Up to 42 mm of precipitation occurred in northern Argentina; however, amounts to the south remained below 14 mm [45 weeks].

5. Turkey:

HOT, DRY CONDITIONS REPORTED.

Little or no precipitation fell and unusually warm weather, with temperatures approaching 5°C above normal, aggravated the unfavorably dry regime (See Special Climate Summary) [8 weeks].

6. South Africa:

WETNESS DIMINISHES.

Most stations reported less than 10 mm of precipitation; however, isolated heavy showers dumped up to 61 mm of rain at a few locations [5 weeks].

7. Eastern Asia:

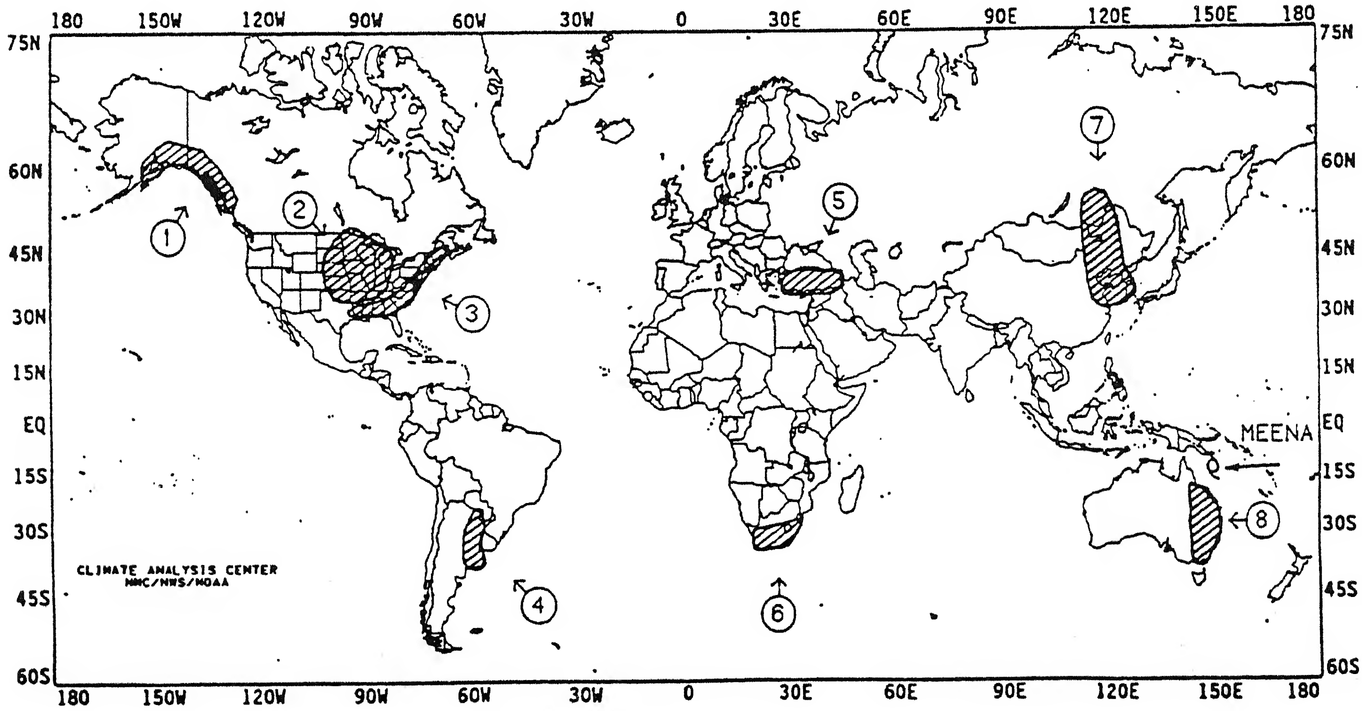
WARM CONDITIONS RETURN.

Above normal temperatures, with departures approaching +5°C, returned to parts of south central Siberia, northeastern China, and Korea [11 weeks].

8. Eastern Australia:

RELIEF FROM WETNESS.

Although some stations reported up to 64 mm of rain, most areas had generally less than 14 mm of precipitation [8 weeks].



EXPLANATION

TEXT: Approximate duration of anomalies is in brackets. Precipitation amounts and temperature departures are this week's values.

MAP: Approximate locations of major anomalies and episodic events are shown. See other maps in this bulletin for current two week temperature anomalies, four week precipitation anomalies, long-term anomalies, and other details.

UNITED STATES WEEKLY CLIMATE HIGHLIGHTS

FOR THE WEEK OF APRIL 30 THROUGH MAY 6, 1989.

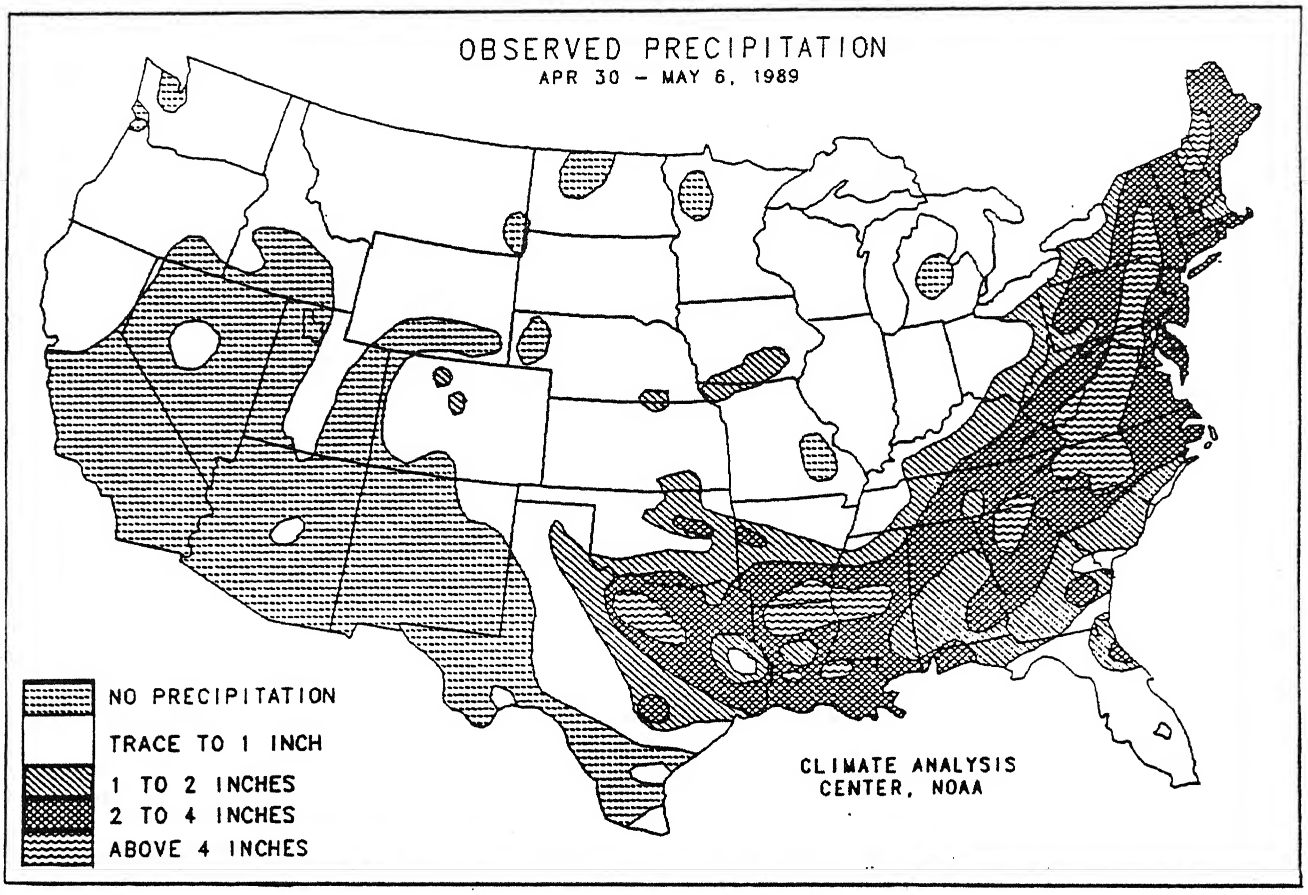
Generally dry and warm conditions prevailed across the western third of the nation while severe weather and heavy precipitation battered much of the South and the Eastern Seaboard. In the West, unseasonable warmth quickly replaced the previous week's brief cool spell. A weak cold front brought some light precipitation to coastal locations of northern California and Oregon. Farther east, an extremely late-season blast of arctic air engulfed the northern two-thirds of the Great Plains and Midwest, abruptly ending the unusually warm weather of the previous two weeks. Ahead of this cold surge, scattered showers and thunderstorms moved through the central Great Plains. To the south and southeast, a slow-moving upper-level disturbance generated widespread thunderstorm activity from north-central Texas eastward to Alabama as much of this area endured numerous outbreaks of severe weather during the week. Parts of northeastern Texas, northern Louisiana, and northern Mississippi reported torrential downpours, orange- sized hail, and several tornadoes. Meanwhile, two different storm systems, one early and one late in the week, raced northeastward up the Atlantic Coast and drenched much of the area. On Monday and Tuesday, the first system brought moderate rains to the mid-Atlantic and New England while triggering strong thunderstorms in Georgia and the Carolinas. Later in the week, widespread thunderstorms preceding a cold front developed throughout the Eastern Seaboard, producing large hail and over two dozen tornadoes in the Carolinas. To the north, inundating rains fell from Virginia northward to Maine as many locations experienced flash flooding. In the colder air behind the front, measurable snow fell as far south as Indianapolis, IN for the first time in 60 years during the month of May.

Reports from the River Forecast Centers (RFC) depicted a week of excessively heavy rainfall across the southern Great Plains, lower Mississippi Valley, Southeast, and the entire East Coast (see Table 1). The largest amounts fell in northern Louisiana, where up to 11.9 inches were recorded (see Figure 1). More than 5 inches of rain were measured at stations in central Texas, Louisiana, southern Arkansas, and west-central Mississippi. Farther east, from northern Georgia northward to Maine, almost every RFC station accumulated more than 2 inches of precipitation (see front cover). In the Northeast, where an unusually mild and dry winter and a very dry April has greatly lowered water-supply reservoirs, the first widespread, substantial precipitation (up to 7.0 inches) since November 1988 provided some relief from long-term dryness. Elsewhere, light to moderate amounts were observed along the central Pacific Coast, in the northern thirds of the Intermountain West and Rockies, and throughout most of the eastern half of the country. Little or no precipitation fell along southeastern Alaska's coast and the northern and southern thirds of the Pacific Coast, in the southern two-thirds of the Intermountain West and Rockies, and in parts of North Dakota, Michigan, and southern Texas.

A cold arctic blast provided an abrupt end to last week's unseasonably warm weather in the middle Missouri, Mississippi, and Tennessee Valleys. The greatest negative temperature departures (between -9° and -11°F) occurred in the western half of the Corn Belt (see Table 2). More than a dozen record lows were set Saturday (May 6) when the core of the cold air moved southward out of Canada. In contrast, above normal temperatures returned to the Far West. Temperatures averaged more than 9°F above normal in parts of the desert Southwest, Great Basin, and along the Pacific Northwest Coast where a few stations tied or set new daily maximum temperature records during the week (see Table 3). Cool conditions also ended in the Northeast as temperatures averaged up to 6°F above normal. Most of Alaska experienced mild conditions, while cool air invaded the Hawaiian Islands.

TABLE 1. Selected stations with more than 3.00 inches of precipitation for the week.

	Total(In)	Station	Total(In)
.A	6.60	Philadelphia, PA	3.72
lle/Pope AFB, NC	6.29	Richmond, VA	3.72
lle/Ft. Bragg NDB,NC	6.21	Allentown, PA	3.72
ın, Hawaii, HI	5.49	Jackson, MS	3.72
ı/Carswell AFB, TX	5.39	Waco, TX	3.61
ı/Meacham, TX	5.13	Martinsburg, WV	3.50
'o, NC	5.01	Baltimore, MD	3.47
ın/Andrews AFB, MD	4.87	Charlotte, NC	3.41
ngton, NH	4.76	Shreveport/Barksdale AFB, LA	3.40
ırre, PA	4.44	Wilmington, DE	3.38
VA	4.44	Washington/National, DC	3.38
l, WV	4.35	Columbus AFB, MS	3.36
ıir/Davison AAF, VA	4.34	Asheville, NC	3.35
'g, PA	4.21	Portland, ME	3.31
NC	4.14	Chicopee/Westover AFB, MA	3.30
ME	4.13	Goldsboro/Seymour-Johnson AFB,NC	3.18
ın/Dulles, VA	4.12	Montpelier, VT	3.16
GA	4.05	Glens Falls, NY	3.13
ıge, LA	3.92	New York/Kennedy, NY	3.13
:. Worth, TX	3.85	Pensacola NAS, FL	3.09
< NAS, ME	3.75	Concord, NH	3.03
't, LA	3.75	Dover AFB, DE	3.01


OBSERVED PRECIPITATION
APR 30 – MAY 6, 1989
NO PRECIPITATION
TRACE TO 1 INCH
1 TO 2 INCHES
2 TO 4 INCHES
ABOVE 4 INCHES
CLIMATE ANALYSIS CENTER, NOAA

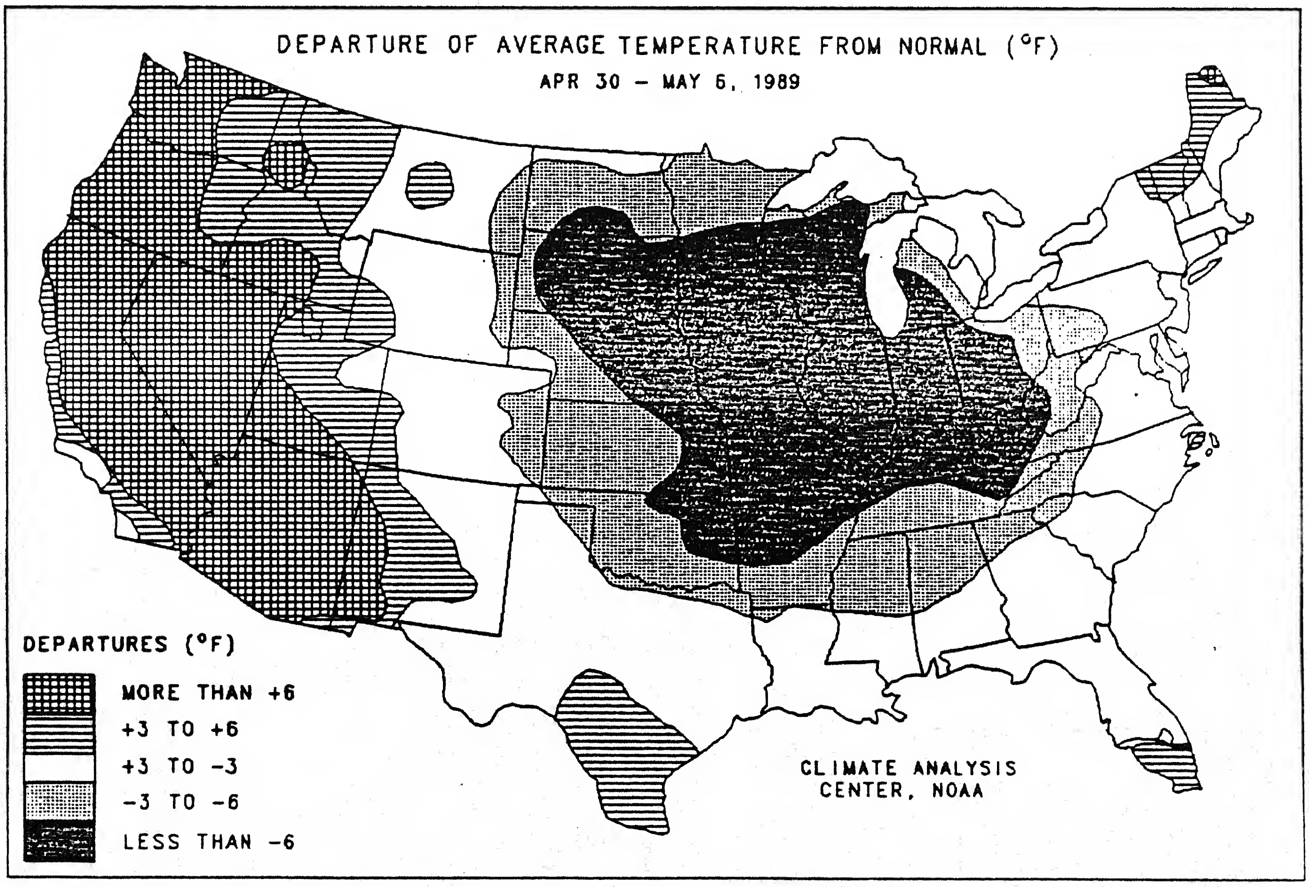

DEPARTURE OF AVERAGE TEMPERATURE FROM NORMAL (°F)
APR 30 – MAY 6, 1989
DEPARTURES (°F)
MORE THAN +6
+3 TO +6
+3 TO -3
-3 TO -6
LESS THAN -6
CLIMATE ANALYSIS CENTER, NOAA

TABLE 2. Selected stations with temperatures averaging 8.0°F or more BELOW normal for the week.

Station	Degrees F Dep.	Degrees F Avg.	Station	Degrees F Dep.	Degrees F Avg.
Cedar Rapids, IA	-11.3	45.6	Eau Claire, WI	-9.1	43.2
Columbia, MO	-10.3	50.7	North Omaha, NE	-9.1	49.6
Springfield, IL	-10.2	49.4	Sioux Falls, SD	-9.0	44.5
Mason City, IA	-10.1	43.6	Ottumwa, IA	-9.0	49.0
Kansas City/Intl., MO	-10.0	52.0	Kansas City/Muni., MO	-8.9	54.1
Moline, IL	- 9.8	47.2	Cincinnati, OH	-8.7	50.6
Waterloo, IA	- 9.7	44.9	Huron, SD	-8.5	44.1
Quincy, IL	- 9.6	49.5	Sioux City, IA	-8.5	48.4
Peoria, IL	- 9.5	47.8	Joplin, MO	-8.4	54.8
Burlington, IA	- 9.5	47.9	Wausau, WI	-8.3	42.5
Springfield, MO	- 9.5	51.6	St. Cloud, MN	-8.2	42.9
Minneapolis, MN	- 9.4	44.2	Indianapolis, IN	-8.1	50.2
La Crosse, WI	- 9.4	45.3	Rockford, IL	-8.0	46.7
Rochester, MN	- 9.3	42.8	Norfolk, NE	-8.0	48.0
Spencer, IA	- 9.2	44.5	Grand Island, NE	-8.0	48.6
Des Moines, IA	- 9.2	48.2			

TABLE 3. Selected stations with temperatures averaging 7.0°F or more ABOVE normal for the week.

Station	Degrees F Dep.	Degrees F Avg.	Station	Degrees F Dep.	Degrees F Avg.
Victorville/George AFB,CA	+13.0	74.3	Redmond, OR	+8.1	55.7
Prescott, AZ	+12.0	65.6	Blythe, CA	+8.0	83.3
Reno, NV	+11.4	62.4	North Bend, OR	+7.9	59.2
Paso Robles, CA	+10.3	69.6	Eureka, CA	+7.9	58.8
Las Vegas, NV	+10.2	79.1	Juneau, AK	+7.8	51.2
Phoenix, AZ	+10.1	83.1	Bellingham, WA	+7.7	58.8
Glendale/Luke AFB, AZ	+10.0	81.9	Astoria, OR	+7.7	57.9
Portland, OR	+ 9.8	63.8	Burley, ID	+7.6	58.5
Olympia, WA	+ 9.7	60.3	Bakersfield, CA	+7.5	74.5
Eugene, OR	+ 9.5	62.1	Sacramento, CA	+7.5	69.5
Fresno, CA	+ 9.4	73.9	Northway, AK	+7.5	45.4
Medford, OR	+ 9.4	63.8	Tucson/Davis-Monthan AFB,AZ	+7.4	76.2
Seattle/Tacoma, WA	+ 9.2	61.7	Salem, OR	+7.4	59.7
Yuma, AZ	+ 9.1	83.8	Cedar City, UT	+7.4	59.5
Quillayute, WA	+ 9.1	57.8	Elko, NV	+7.4	55.9
Winnemucca, NV	+ 8.9	59.6	Lewiston, ID	+7.3	62.2
Lovelock, NV	+ 8.7	62.7	Thermal, CA	+7.2	81.8
Tucson, AZ	+ 8.3	77.7			

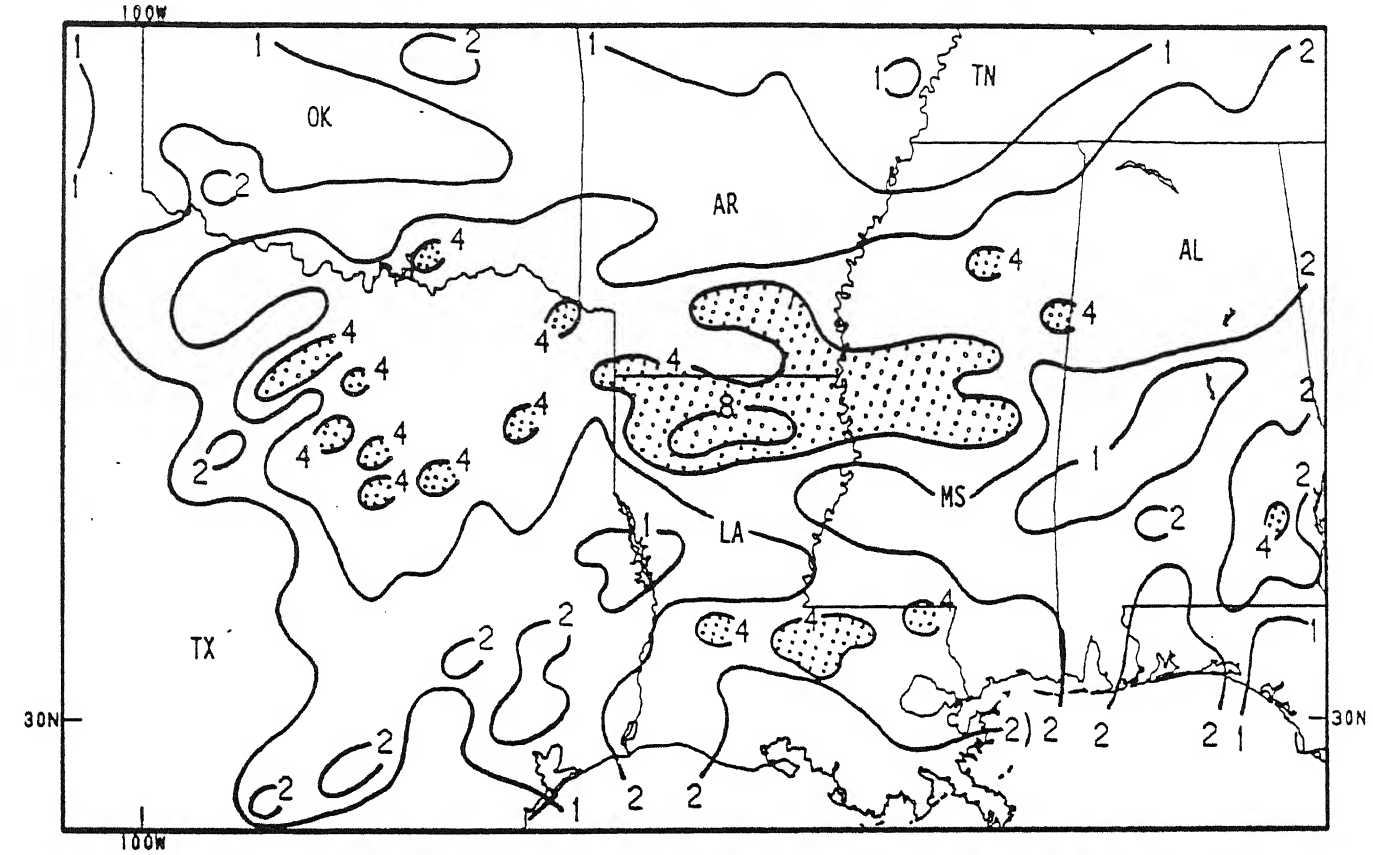
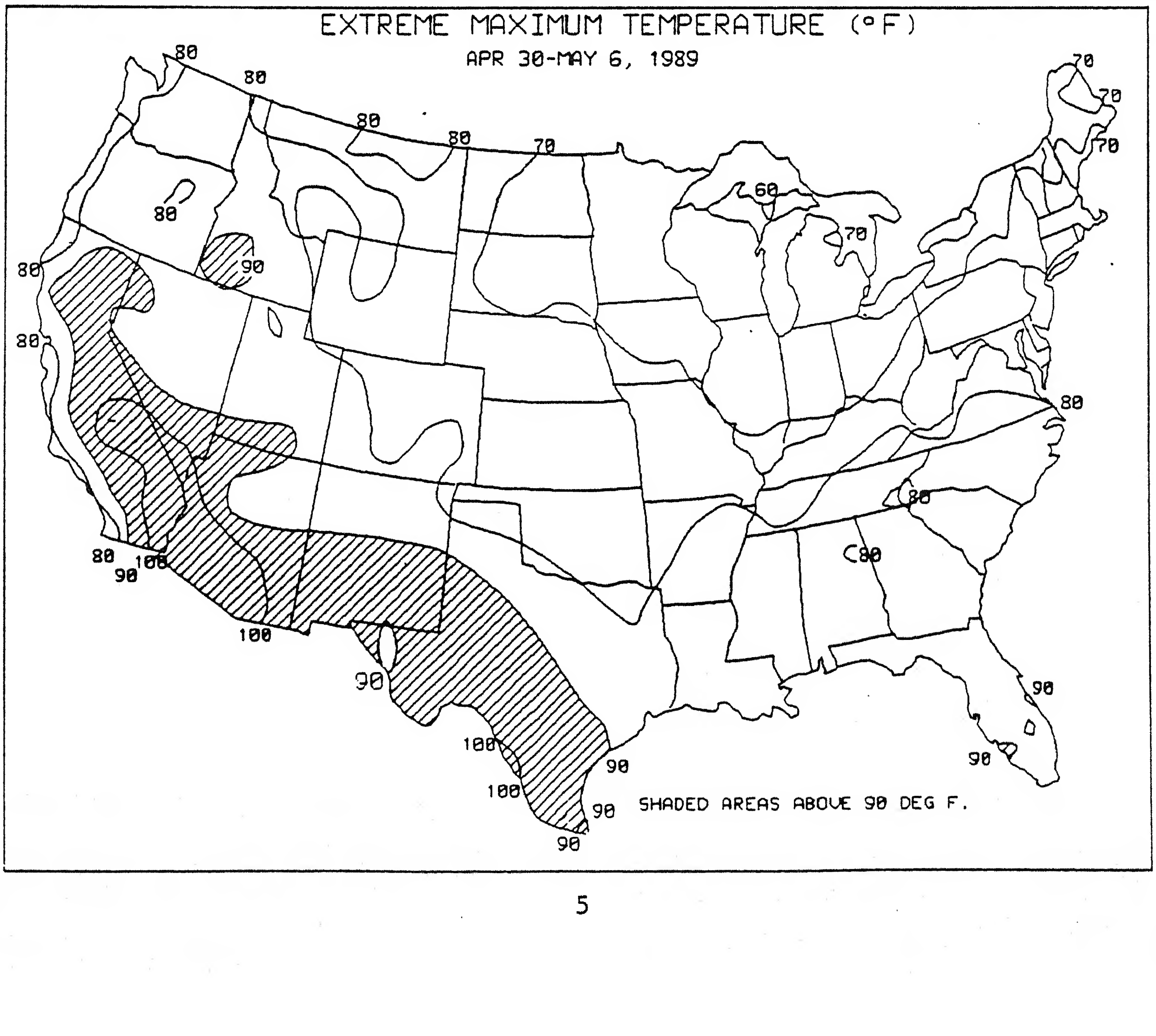
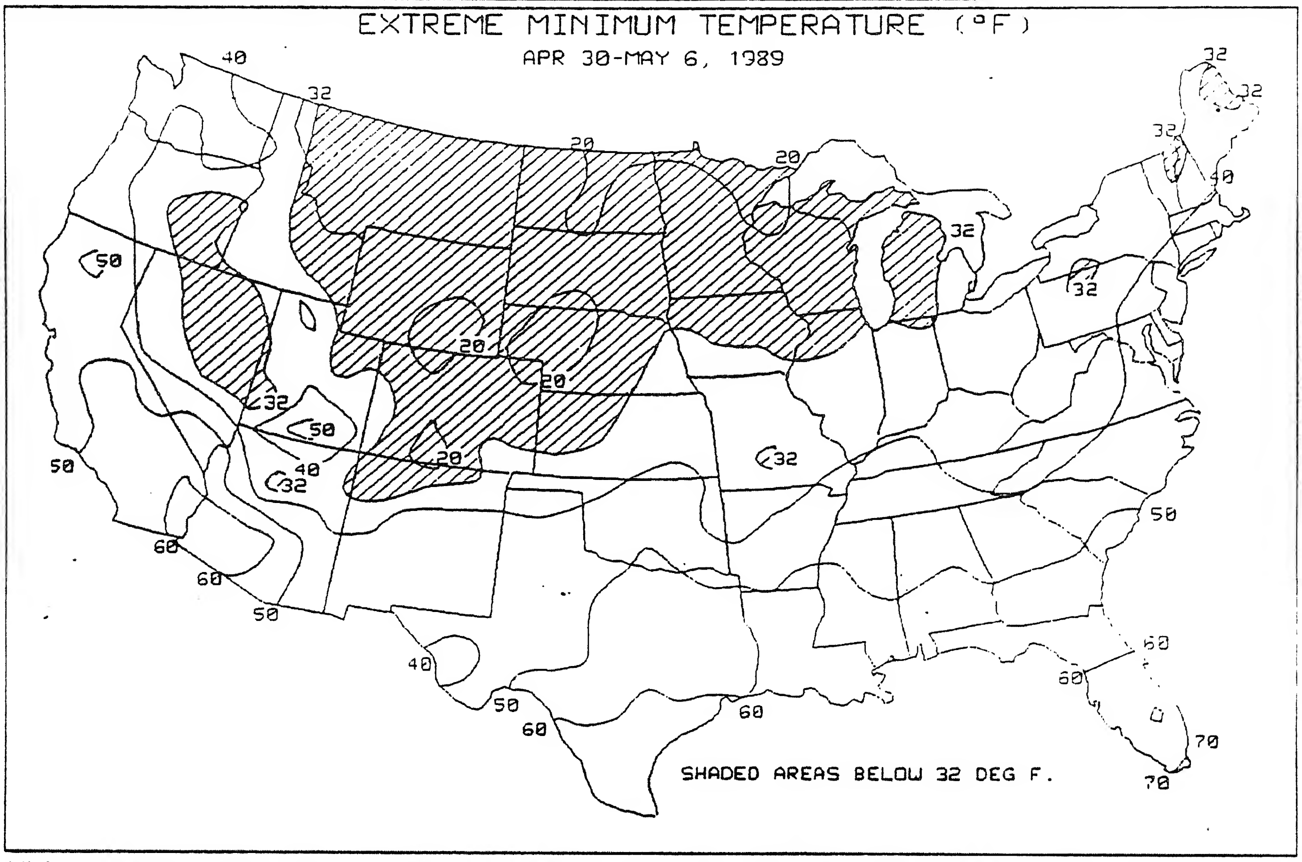
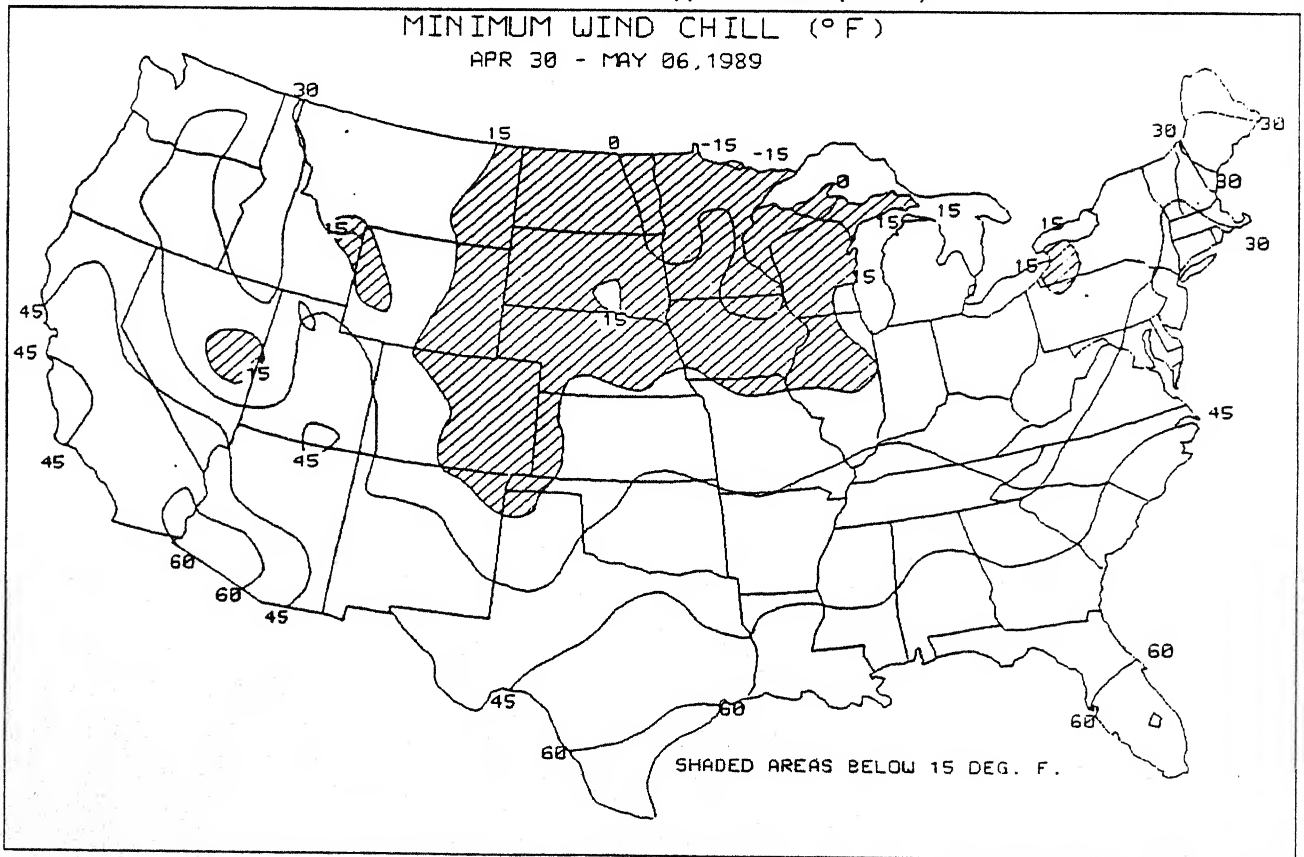


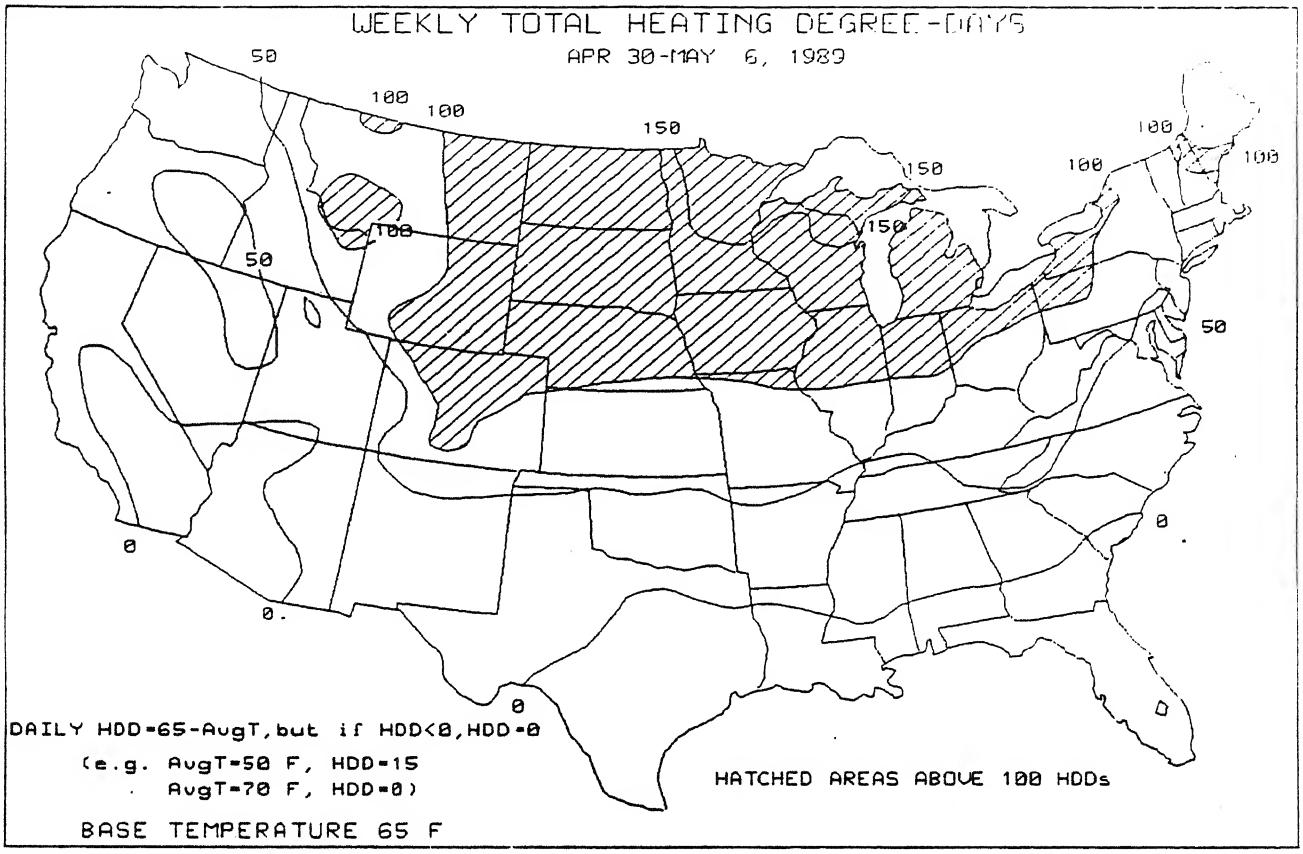
Figure 1. Total precipitation (inches) during the week of April 30 - May 6, 1989. Stippled areas are more than 4 inches, and isopleths are only drawn for 1, 2, 4, and 8 inches. Analyses are based upon first-order, airways, and River Forecast Center stations. Nearly a foot of rain inundated portions of northern Louisiana.



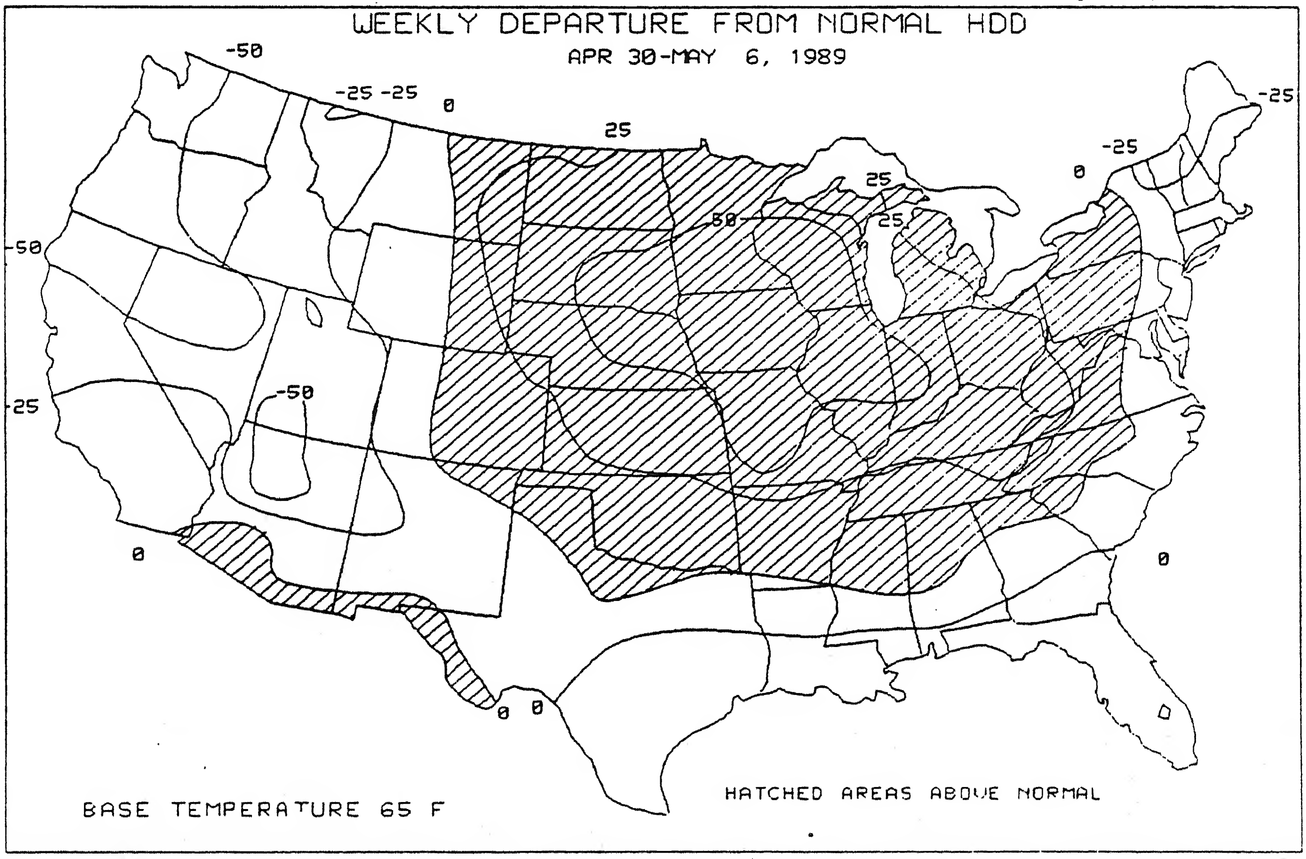


Minimum temperatures more representative of March than early May chilled the upper Midwest and the northern thirds of the Rockies and Plains as lows dipped well below freezing (top). Gusty winds combined with the low temperatures to produce subzero wind chills across the upper Midwest (bottom).





Below normal temperatures sent total HDDs above 100 in the northern Plains and Great Lakes (top) as these regions, along with the Ohio, Tennessee, and middle Mississippi Valleys, registered above normal demands. Warmer air brought below normal demands to the Rockies, Pacific Northwest, and northern New England (bottom).



APPARENT TEMPERATURE

The apparent temperature is a measure of human discomfort due to combined heat and high humidity. It was developed by Dr. R. G. Steadman (1979) and is based on studies of human physiology and textile (clothing) science. The apparent temperature is designed so that apparent temperature exceeds the actual air temperature when humidity is relatively high. The apparent temperature then measures the increased physiological heat stress and discomfort associated with higher than comfortable humidities. Note that the apparent temperature is less than the actual air temperature when humidity is relatively low and that the apparent temperature indicates the reduced stress and increased comfort associated with the higher rate of evaporative cooling of the skin.

Apparent temperatures greater than 80°F (27°C) are likely to produce some discomfort. Values in excess of 105°F (41°C) may be dangerous and even life-threatening, with severe heat exhaustion or heat stroke possible if the exposure is prolonged or physical activity is high. The degree of stress may vary with age, health, and body characteristics.

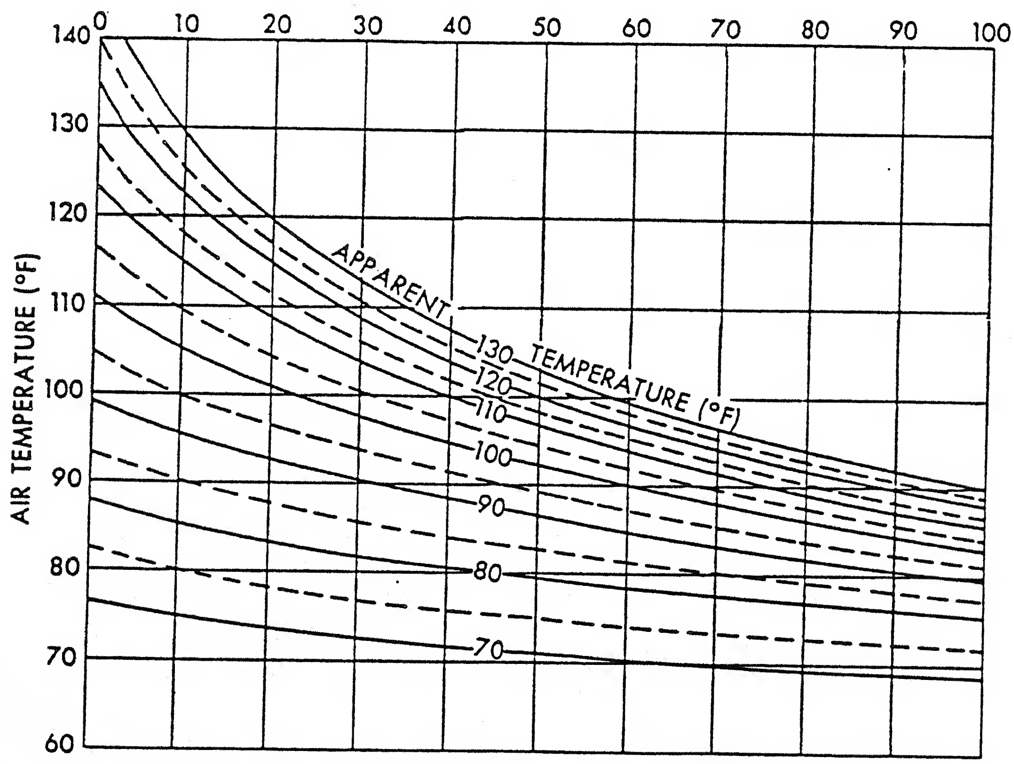
The apparent temperature as used here does not consider the effects of air movement (wind speed) or exposure to sunshine on the degree of discomfort or stress.

Reference: Steadman, R. G., 1979: The Assessment of Sultriness, Part I: A Temperature-Humidity Index Based on Human Physiology and Clothing Science. (*Journal of Applied Meteorology,* Vol. 18, pp. 861-873.)

GENERAL HEAT STRESS INDEX

DANGER CATEGORY	APPARENT TEMPERATURE (°F)	HEAT SYNDROME
IV. EXTREME DANGER	GREATER THAN 130°	HEATSTROKE OR SUNSTROKE IMMINENT.
III. DANGER	105° - 130°	SUNSTROKE, HEAT CRAMPS, OR HEAT EXHAUSTION LIKELY. HEAT STROKE POSSIBLE WITH PROLONGED EXPOSURE AND PHYSICAL ACTIVITY.
II. EXTREME CAUTION	90° - 105°	SUNSTROKE, HEAT CRAMPS, AND HEAT EXHAUSTION POSSIBLE WITH PROLONGED EXPOSURE AND PHYSICAL ACTIVITY.
I. CAUTION	80° - 90°	FATIGUE POSSIBLE WITH PROLONGED EXPOSURE AND PHYSICAL ACTIVITY.

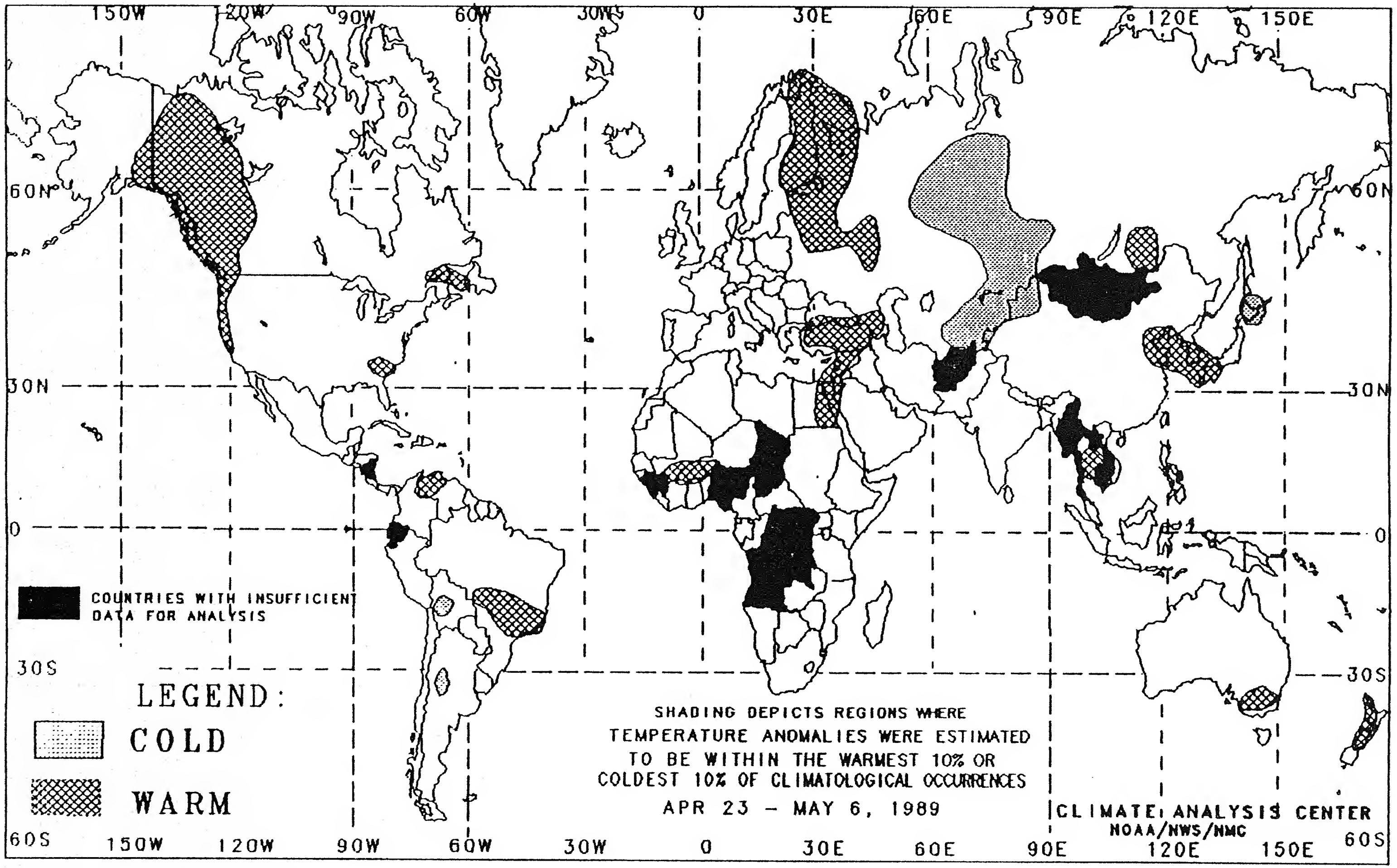
NOTE: *DEGREE OF HEAT STRESS MAY VARY WITH AGE, HEALTH, AND BODY CHARACTERISTICS.*



Relationship of air temperature and relative humidity to apparent temperature (after Steadman, 1979). This graph can be used for various combinations of air temperature and relative humidity. (Provided by National Climatic Data Center, NESDIS, NOAA.)

GLOBAL TEMPERATURE ANOMALIES

2 WEEKS



The anomalies on this chart are based on approximately 2500 observing stations for which at least 13 days of temperature observations were received from synoptic reports. Many stations do not operate on a twenty-four hour basis so many night time observations are not taken. As a result of these missing observations the estimated minimum temperature may have a warm bias. This in turn may have resulted in an overestimation of the extent of some warm anomalies.

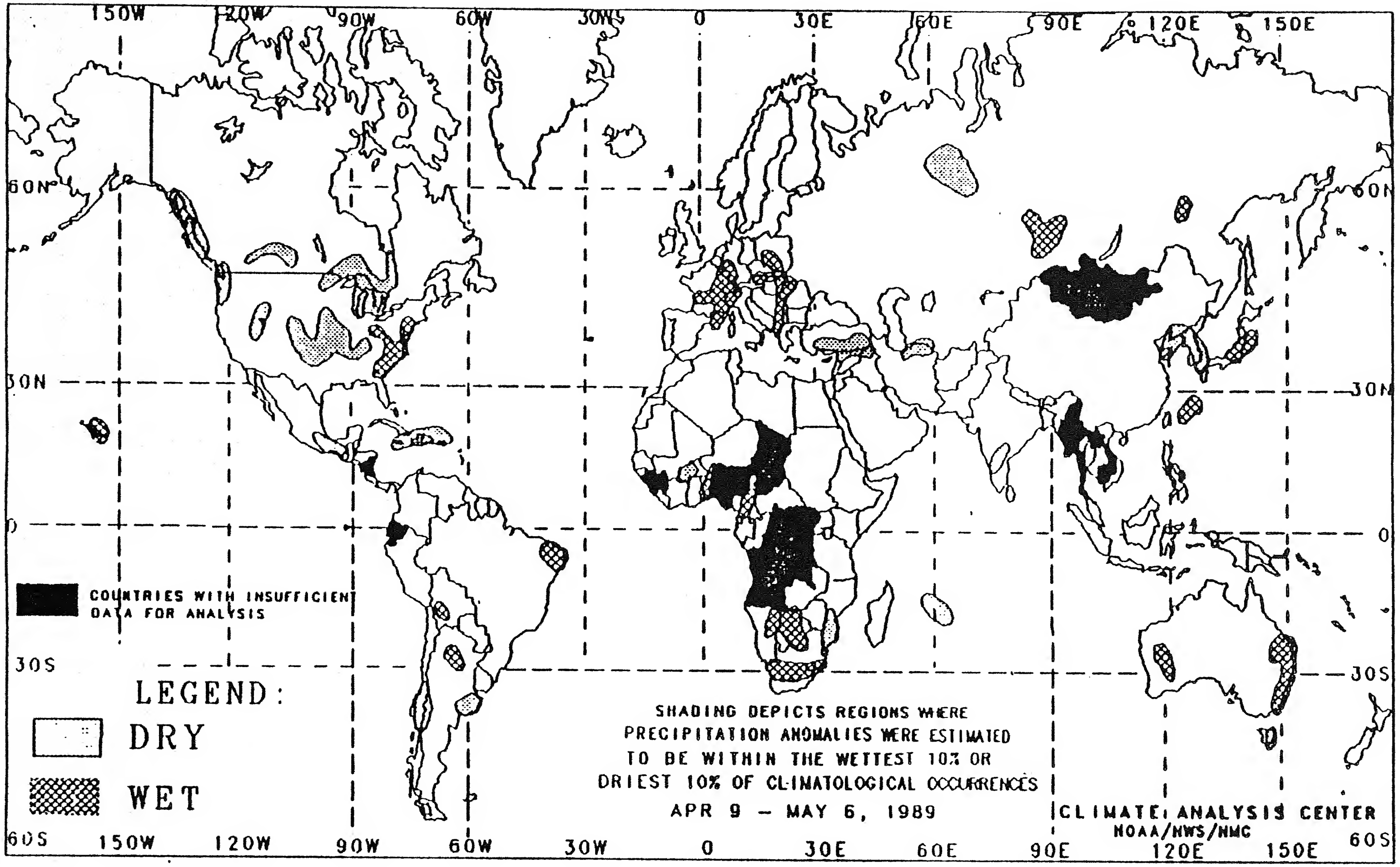
Temperature anomalies are not depicted unless the magnitute of temperature departures from normal exceeds 1.5°C.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

This chart shows general areas of two week temperature anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

GLOBAL PRECIPITATION ANOMALIES

4 WEEKS



The anomalies on this chart are based on approximately 2500 observing stations for which at least 27 days of precipitation observations (including zero amounts) were recieved or estimated from synoptic reports. As a result of both missing observations and the use of estimates from synoptic reports (which are conservative), a dry bias in the total precipitation amount may exist for some stations used in this analysis. This in turn may have resulted in an overestimation of the extent of some dry anomalies.

In climatologically arid regions where normal precipitation for the four week period is less than 20 mm, dry anomalies are not depicted. Additionally, wet anomalies for such arid regions are not depicted unless the total four week precipitation exceeds 50 mm.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South Africa, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

The chart shows general areas of four week predipitation anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

UNITED STATES MONTHLY CLIMATE SUMMARY

APRIL 1989

The month of April is normally characterized by highly-variable weather patterns due to the transition from winter to summer conditions with the slow northward retreat of the jet stream. April 1989 was anything but erratic in the western third of the U.S. as a strong ridge of high pressure anchored over the Far West during the first three weeks of April kept much of the region extremely dry and unseasonably warm. In contrast, frequent collisions of cold, dry Canadian air with warm, moist Gulf flow produced severe weather, including torrential downpours, damaging winds, large hail, and dozens of tornadoes, across much of the eastern half of the nation. Early in the month, severe thunderstorms spawned numerous tornadoes in portions of the Great Plains, Midwest, mid-Atlantic, and the Southeast, especially in Georgia, as more than a dozen twisters touched down in the northern section of the state. Late-season snows covered most of the Appalachians and the northern half of the Rockies, where more than a foot fell on western North Carolina and central Colorado. Moderate to heavy snowfall provided some relief from long- term dryness in the parched regions of eastern Colorado and western Kansas (up to 11 inches at Goodland, KS). Even areas of northeastern North Carolina received up to 5 inches of snow on April 11, making it the latest date with measurable snow in 110 years of records at Wilmington, NC. By mid-month, much of the country experienced dry conditions as warmth continued in the West and unseasonably cool weather prevailed in the East. Some severe weather occurred in the Great Plains and upper Midwest, and scattered showers and thunderstorms slightly eased long-term moisture deficits in southern Florida. As May approached, cooler air invaded the Far West, while summer-like heat covered much of the Great Plains, lower Midwest, and Southeast. Severe weather once again broke out along a stationary front that stretched from the Dakotas eastward to the central Appalachians and southeastward to the North Carolina coast, and in the southern Great Plains in association with a strong cold front. Farther west, an upper-level disturbance brought scattered showers and thunderstorms to California, including a rare tornado near Fresno, CA. While abnormally dry and mild conditions persisted along Alaska's southeastern coast, portions of the Hawaiian Islands were inundated with torrential rains.

Even with the numerous outbreaks of severe weather, relatively few areas reported excess April precipitation. The above normal precipitation areas included most of the southern half of the Atlantic Coast states, parts of the Ohio Valley, the northern thirds of the Intermountain West, Rockies, and the Great Plains, extreme southern Texas, and portions of the Hawaiian Islands (see Table 1, Figures 1 and 2). According to the River Forecast Centers, the greatest monthly amounts (between 6 and 10 inches) in the contiguous U.S. were found in southern Mississippi and Alabama, central Georgia, and eastern North Carolina, while isolated stations in the Cascades received more than 10 inches. Even though above normal April precipitation was recorded in the drought-stricken regions of the northern Rockies and Great Plains, totals were generally between 2 and 4 inches.

Most of the country observed subnormal April precipitation, most notably along the southern and northern thirds of the Pacific Coast, the southern two-thirds of the Intermountain West, Rockies, and Plains, the Tennessee and the lower and middle Mississippi Valleys, the extreme upper Midwest, along most of the Gulf Coast, throughout the Great Lakes region, in much of New England, and along the southeast coast of Alaska (see Table 2, Figures 1 and 2). Less than half the normal April precipitation was reported throughout the Southwest, the southern half of the Rockies, the central Great Plains, the lower Mississippi Valley, the western Great Lakes, and in the north-central Appalachians as many sites recorded their lowest April precipitation (see Table 5 and Figure 1). Farther north, dry weather continued for the third consecutive month along Alaska's southeastern coast as many stations received less than 50% of the normal monthly precipitation; however, a few locations (e.g. Cordova and Valdez) measured surplus rainfall. Regionally, the Southwest (AZ, NM, UT, CO), South (TX, OK, KS, LA, AR, MS), West (CA, NV), East-North Central (MN, IA, WI, MI), and Northeast (MD, DE, PA and all states north) recorded the FIRST, second, sixth, twelfth, and sixteenth driest April since 1895, respectively, according to the National Climatic Data Center (NCDC). Overall, April 1989 ranked as the third driest April during the past 95 years in the contiguous U.S.; however, on a local basis, some stations experienced the wettest April on record in the Northwest (WA, OR, ID) and Southeast (VA, NC, SC, GA, AL, FL).

Record and near-record warmth covered much of the western third of the United States throughout most of April until cooler weather finally moderated temperatures towards the end of the month. Early in April, hot, dry easterly winds, known as the Santa Anas, sent readings into the nineties and one hundreds at coastal California stations that are normally cooled by onshore ocean breezes, and numerous daily record highs were established. During the last week of April, summer-like heat prevailed across the southern half of the Plains, the lower Midwest, and the Southeast as dozens of sites tied or set new daily and/or extreme April maximum temperature records (see Tables 6 and 7). The greatest temperature departures (between +6° and +12°F) occurred throughout the Southwest and in western, northern, and central Alaska (see Table 3, Figures 3 and 4). Elsewhere, April temperatures averaged above normal across most of the western half of the nation, throughout Alaska, and in southern Florida. According to the NCDC, the Southwest, West, and Northwest regions observed the FIRST, second, and seventh warmest April since 1895.

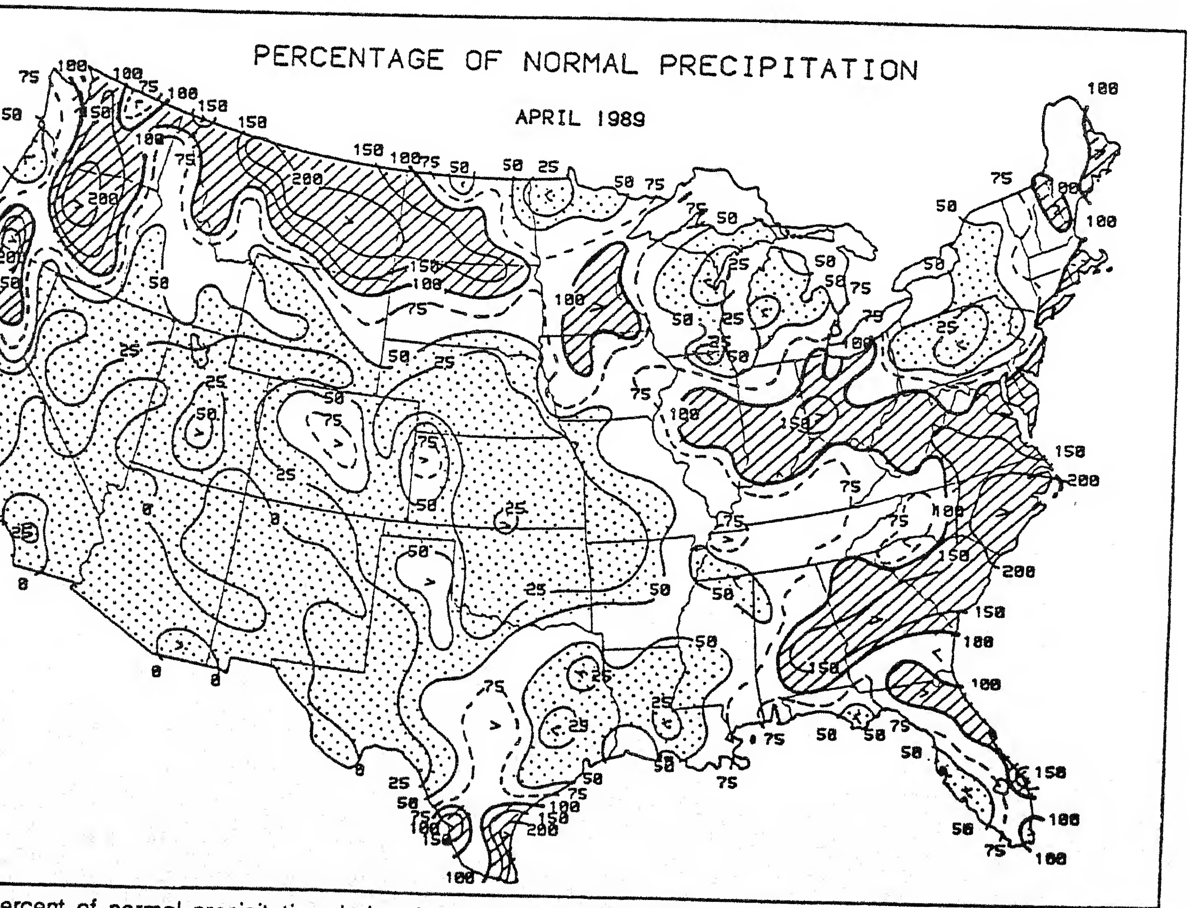
In contrast, much of the eastern half of the U.S. and the Hawaiian Islands experienced subnormal April temperatures, although the greatest negative departures were only -4°F (see Table 4, Figures 3 and 4). During the second week of April, a late-season cold spell chilled much of the eastern two-thirds of the country as more than 70 stations tied or set new daily minimum temperatures. Subfreezing temperatures were reported as far south as northern Texas, northern Louisiana, and central Mississippi and Alabama, while lows in the teens were observed across the northern half of the Plains and western Great Lakes. Warm weather towards the end of the month significantly reduced the magnitude of the negative April temperature departures in the Southeast.

APRIL STATIONS WITH MORE THAN 150% OF NORMAL PRECIPITATION AND IAN FOUR INCHES OF PRECIPITATION; OR, STATIONS WITH MORE THAN CHES OF PRECIPITATION AND NO NORMALS.

	TOTAL (INCHES)	PCT. OF NORMAL
awaii, HI	37.20	284.4
HI	12.92	1207.5
HI	11.22	251.0
, NC	9.57	299.1
rt Bragg, NC	8.65	*******
pe AFB, NC	8.31	*******
ew River, NC	7.66	*******
C	7.60	255.0
L	7.26	166.5
	6.52	191.2
	6.47	165.9

STATION	TOTAL (INCHES)	PCT. OF NORMAL
West Palm Beach, FL	6.04	188.7
Goldsboro/Seymour AFB, NC	5.71	153.9
Macon,GA	5.61	159.4
New Bern, NC	5.47	183.6
Dover AFB, DE	5.40	155.2
Augusta, GA	5.24	158.8
Raleigh/Durham, NC	4.91	169.9
Charleston, SC	4.84	189.1
Florence, SC	4.46	152.7
Kingsville NAS, TX	4.31	267.7

(Note: Stations without precipitation normals are indicated by asterisks.)



ercent of normal precipitation during April 1989. Dotted areas are less than 50%, and hatched areas normal. Most of the lower 48 states and southeastern Alaska experienced dry conditions, while et weather occurred in the northern thirds of the Intermountain West and Rockies, the Ohio Valley, outhern Atlantic Coast, and in parts of Hawaii.

TABLE 2. APRIL STATIONS WITH LESS THAN 50% OF NORMAL PRECIPITATION AND MORE THAN THREE INCHES OF NORMAL PRECIPITATION.

STATION	TOTAL (INCHES)	PCT. OF NORMAL	NORMAL (INCHES)	STATION	TOTAL (INCHES)	PCT. OF NORMAL	NORMAL (INCHES)
Chanute, KS	0.06	1.7	3.53	Allentown, PA	1.31	33.5	3.91
Fayetteville, AR	0.10	2.2	4.58	Milwaukee, WI	1.33	39.7	3.35
Joplin, MO	0.11	2.9	3.83	Binghamton, NY	1.37	44.6	3.07
Springfield, MO	0.15	3.7	4.04	Monroe, LA	1.40	28.3	4.95
Enid/Vance AFB, OK	0.17	5.4	3.12	Pittsburgh, PA	1.43	43.2	3.31
McAlester, OK	0.32	7.1	4.54	Little Rock, AR	1.45	26.9	5.39
Tulsa, OK	0.34	8.2	4.13	Worcester, MA	1.45	37.2	3.90
Lufkin, TX	0.46	10.8	4.27	Annette Island, AK	1.46	16.6	8.81
Apalachicola, FL	0.48	14.8	3.25	Rome/Griffiss AFB, NY	1.47	48.2	3.05
Harrison, AR	0.51	10.8	4.74	Houston, TX	1.48	39.6	3.74
Fort Smith, AR	0.56	13.4	4.18	Marquette, MI	1.48	40.8	3.63
Topeka, KS	0.62	20.1	3.08	Kansas City/Int'l, MO	1.50	44.9	3.34
Williamsport, PA	0.65	18.5	3.52	Flint, MI	1.50	49.3	3.04
Longview, TX	0.67	12.9	5.19	Syracuse, NY	1.52	45.8	3.32
Muskegon, MI	0.72	22.9	3.14	Youngstown, OH	1.56	45.4	3.44
Saginaw, MI	0.75	25.0	3.00	Waco, TX	1.60	42.3	3.78
Altoona, PA	0.81	22.8	3.55	Tuscaloosa, AL	1.65	30.1	5.48
College Station, TX	0.87	20.1	4.34	Rumford, ME	1.74	49.3	3.53
Wilkes-Barre, PA	0.97	32.0	3.03	Blytheville AFB, AR	1.78	41.0	4.34
Anderson, SC	0.98	24.9	3.94	Hickory, NC	1.79	47.0	3.81
Rockford, IL	0.99	23.6	4.20	Dallas/Fort Worth, TX	1.86	45.5	4.09
Martinsburg, WV	1.00	31.0	3.23	Columbia, MO	1.94	49.9	3.89
Harrisburg, PA	1.06	33.2	3.19	Cape Girardeau, MO	1.97	44.0	4.48
Lafayette, LA	1.07	21.0	5.10	Memphis, TN	2.13	37.0	5.75
Ottumwa, IA	1.07	30.4	3.52	Jackson, MS	2.13	37.6	5.66
Utica, NY	1.09	31.2	3.49	Alex./England AFB, LA	2.15	38.9	5.53
Sitka, AK	1.10	18.6	5.91	Astoria, OR	2.27	47.8	4.75
West Plains, MO	1.17	25.2	4.64	Baton Rouge, LA	2.34	41.9	5.59
Chicago/O'Hare, IL	1.30	33.8	3.85	Yakutat, AK	2.65	30.8	8.61

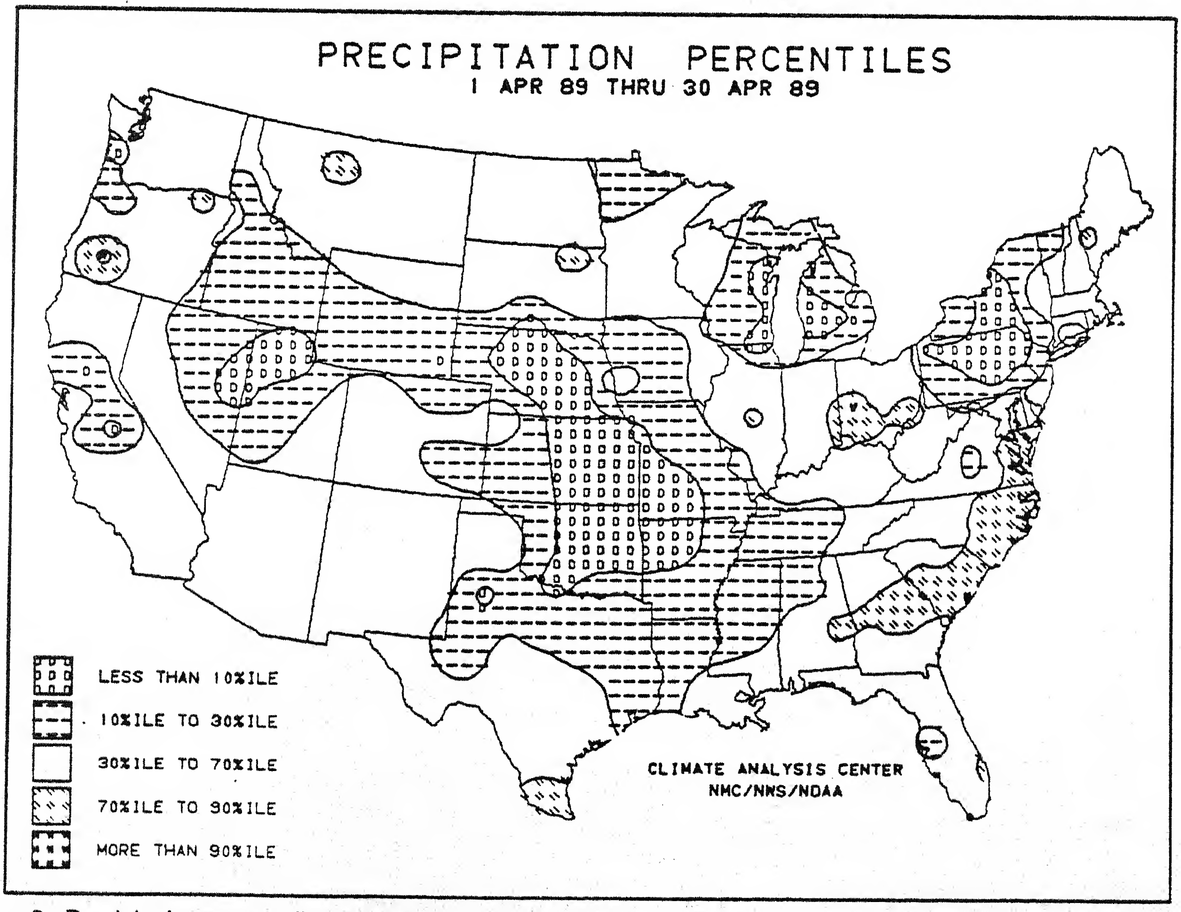


Figure 2. Precipitation percentiles during April 1989. Statistically and historically, it was one of the driest Aprils (less than 10%ile) in most of the West, central Great Plains, Great Lakes, and northern Appalachians.

TABLE 3. APRIL AVERAGE TEMPERATURES MORE THAN 5.0°F ABOVE NORMAL.

STATION	DEPARTURE (°F)	AVERAGE (°F)	STATION	DEPARTURE (°F)	AVERAGE (°F)
Phoenix, AZ	+12.1	80.1	Bethel, AK	+6.2	29.9
Prescott, AZ	+10.7	60.2	Bakersfield, CA	+6.1	68.7
Glendale/Luke AFB, AZ	+10.4	77.8	Albuquerque, NM	+6.1	61.3
Las Vegas, NV	+9.2	72.7	Burley, ID	+6.1	51.8
Tucson, AZ	+8.8	73.8	San Francisco, CA	+5.9	60.8
Flagstaff, AZ	+8.8	50.4	Portland, OR	+5.9	56.3
Tuscon/Davis-Monthan AFB, AZ	+8.7	73.2	Lewiston, ID	+5.9	56.1
Victorville/George AFB, CA	+8.4	66.2	Eugene, OR	+5.9	55.6
Kotzebue, AK	+8.4	21.2	Paso Robles, CA	+5.8	61.7
Yuma, AZ	+8.3	79.0	Salt Lake City, UT	+5.8	54.7
Barrow, AK	+8.0	6.5	Salem, OR	+5.8	54.7
Ely, NV	+7.9	48.9	Rock Springs/Sweetwater, WY	+5.8	45.6
Winslow, AZ	+7.6	60.6	Fairbanks, AK	+5.8	36.1
Reno, NV	+7.6	54.0	Elko, NV	+5.7	49.1
Cedar City, UT	+7.3	54.2	Big Delta, AK	+5.7	36.6
Blythe, CA	+7.2	77.9	St. Paul Island, AK	+5.7	33.8
Fresno, CA	+7.2	67.3	Roswell, NM	+5.6	65.7
Deming, NM	+7.1	65.4	Santa Maria, CA	+5.6	59.7
Medford, OR	+7.0	57.4	Grand Junction, CO	+5.6	57.0
Unalakleet, AK	+7.0	28.8	Farmington, NM	+5.5	56.7
Northway, AK	+6.9	34.9	Winnemucca, NV	+5.4	50.7
Thermal, CA	+6.7	77.1	Salina, KS	+5.3	59.8
Lovelock, NV	+6.7	55.1	Sacramento, CA	+5.2	63.3
Douglas, AZ	+6.6	66.3	Eureka, CA	+5.2	54.7
Nome, AK	+6.6	24.5	Sitka, AK	+5.2	45.1
Redmond, OR	+6.5	50.0	King Salmon, AK	+5.2	36.4
McGrath, AK	+6.5	33.7	Russell, KS	+5.1	58.3
Imperial, CA	+6.4	76.3	Los Angeles, CA	+5.0	64.8

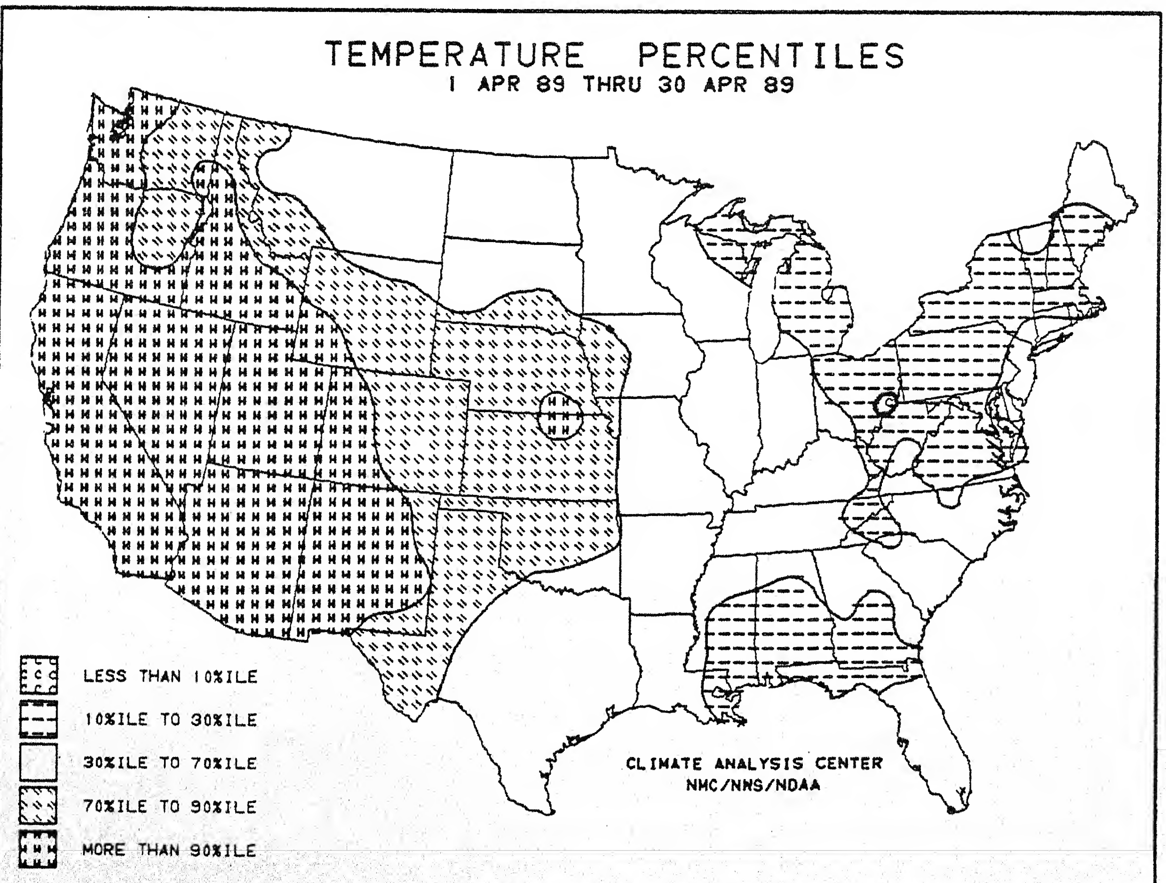


Figure 3. Temperature percentiles during April 1989. Statistically and historically, it was one of the warmest Aprils (more than 90%ile) across most of the West.

TABLE 4. APRIL AVERAGE TEMPERATURES MORE THAN 3.0°F BELOW NORMAL.

STATION	DEPARTURE (°F)	AVERAGE (°F)	STATION	DEPARTURE (°F)	AVERAGE (°F)
Elkins, WV	-4.2	46.2	Pittsburgh, PA	-3.4	46.8
Parkersburg, WV	-4.2	50.0	Park Falls, WI	-3.3	38.1
Rochester, NY	-4.0	42.1	Youngstown, OH	-3.2	44.2
Morgantown, WV	-3.9	48.5	Akron, OH	-3.2	45.3
Rome/Griffiss AFB, NY	-3.8	42.1	Columbus, OH	-3.2	48.2
Mt. Washington, NH	-3.5	19.2	Utica, NY	-3.1	41.5
Buffalo, NY	-3.4	41.9	Cleveland, OH	-3.1	45.3
Saginaw, MI	-3.4	42.4	Hampton/Langley AFB, VA	-3.0	54.7
Poughkeepsie, NY	-3.4	44.6			

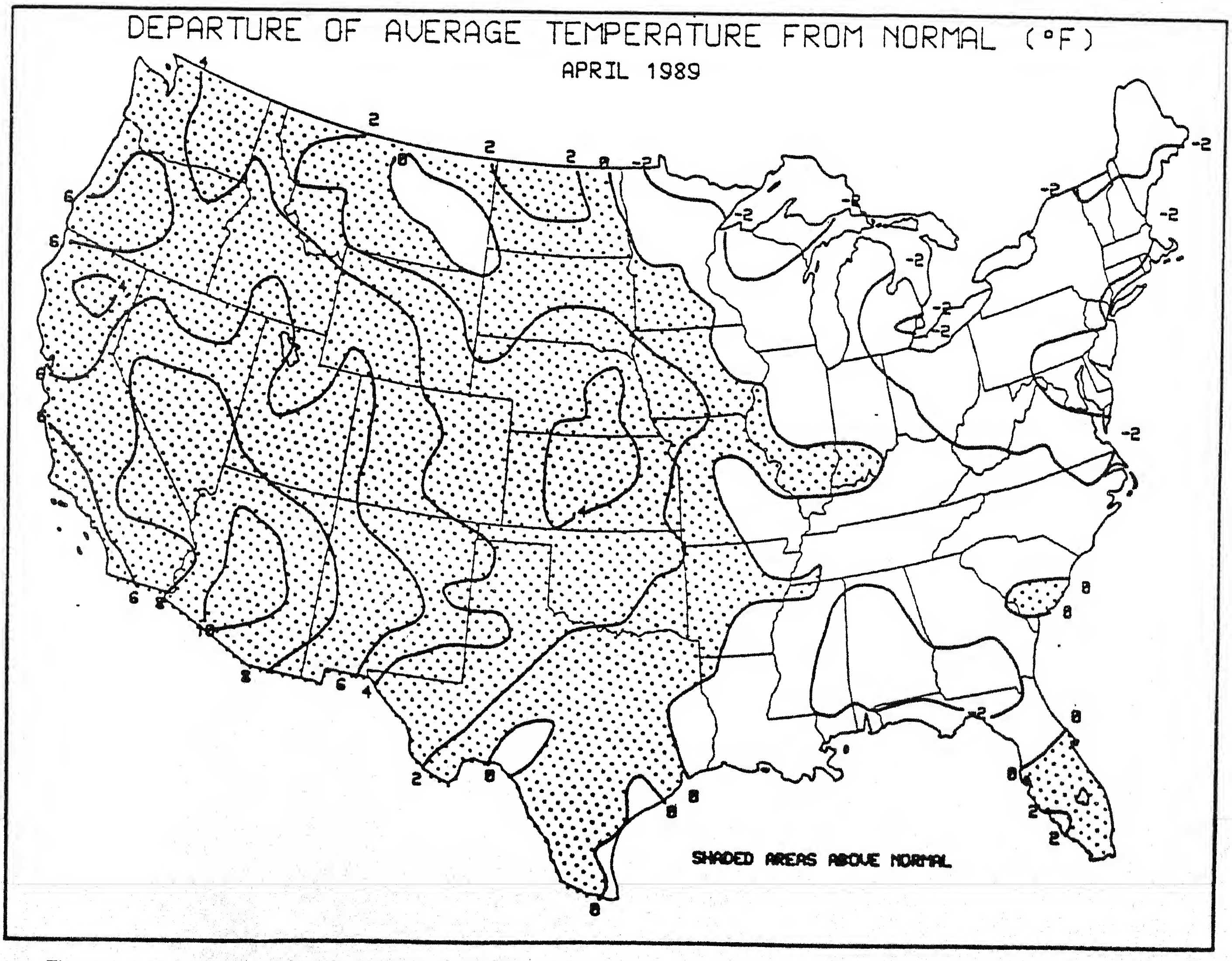


Figure 4. Temperature departure from normal (°F) during April 1989. Shaded areas are above normal, and isotherms are drawn for every 2°F. It was the warmest April on record since 1895 in the Southwest (AZ, NM, UT, CO), while subnormal April temperatures prevailed in the East.

TABLE 5. RECORD APRIL TOTAL PRECIPITATION.

STATION	TOTAL (INCHES)	NORMAL (INCHES)	PCT. OF NORMAL	RECORD TYPE	RECORDS BEGAN
Kahului, Maui, HI	12.92	1.07	1207.5	HIGHEST	1947
Grand Rapids, MI	1.79	3.57	50.1	LOWEST	1947
Rockford, IL	0.99	4.20	23.6	LOWEST	1931
Muskegon, MI	0.72	3.14	22.9	LOWEST	1951
Williamsport, PA	0.65	3.52	18.5	LOWEST	1947
Topeka, KS	0.62	3.08	20.1	LOWEST	1887
Fort Smith, AR	0.56	4.18	13.4	LOWEST	1947
Green Bay, WI	0.49	2.68	18.3	LOWEST	1947
Concordia, KS	0.37	2.26	16.4	LOWEST	1886
Tulsa, OK	0.34	4.13	8.2	LOWEST	1951
Wichita Falls, TX	0.32	2.96	10.8	LOWEST	1943
Lincoln, NE	0.26	2.81	9.3	LOWEST	1971
Oklahoma City, OK	0.17	2.88	5.9	LOWEST	1947
Springfield, MO	0.15	4.04	3.7	LOWEST	1951
Grand Island, NE	0.09	2.62	3.4	LOWEST	1944
Lubbock, TX	0.04	1.06	3.8	LOWEST	1951
Ely, NV	0.00	0.91	0.0	LOWEST	1939
Los Angeles, CA	0.00	0.91	0.0	LOWEST	1936
Bakersfield, CA	0.00	0.69	0.0	LOWEST	1938
Albuquerque, NM	0.00	0.39	0.0	LOWEST	1940
Tucson, AZ	0.00	0.30	0.0	LOWEST	1940
Phoenix, AZ	0.00	0.26	0.0	LOWEST	1938

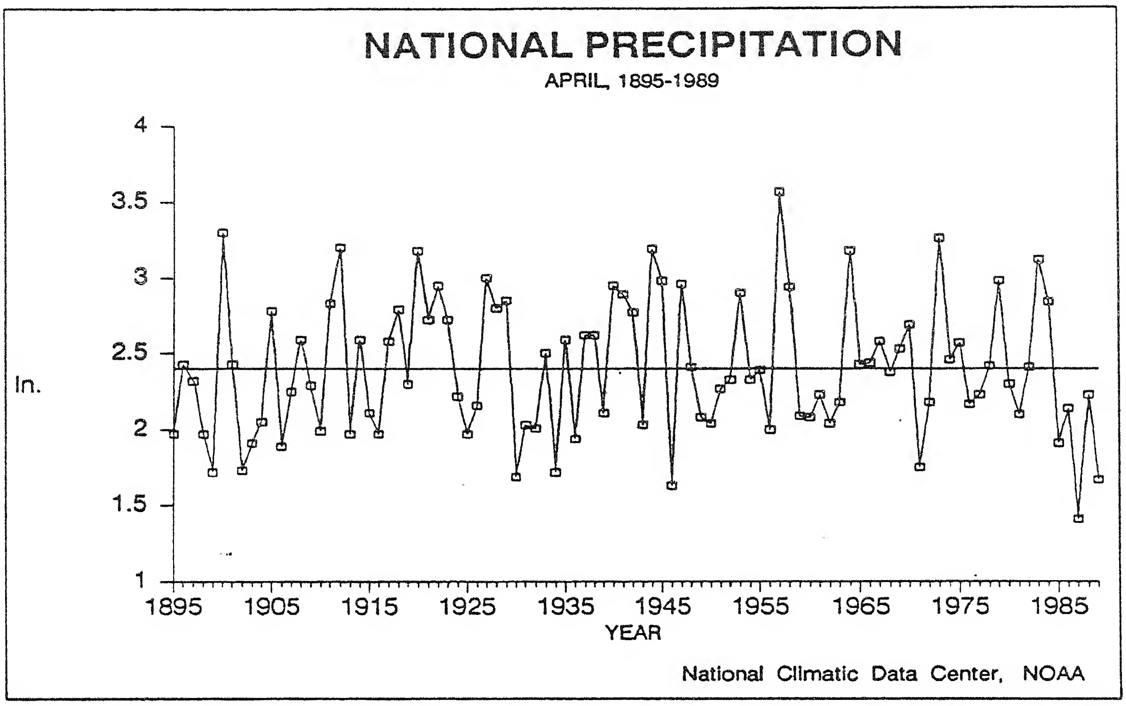
Note: Trace precipitation is considered no precipitation. Stations with no precipitation are only included if normal precipitation is 0.25 inches or more.

TABLE 6. RECORD APRIL AVERAGE TEMPERATURES.

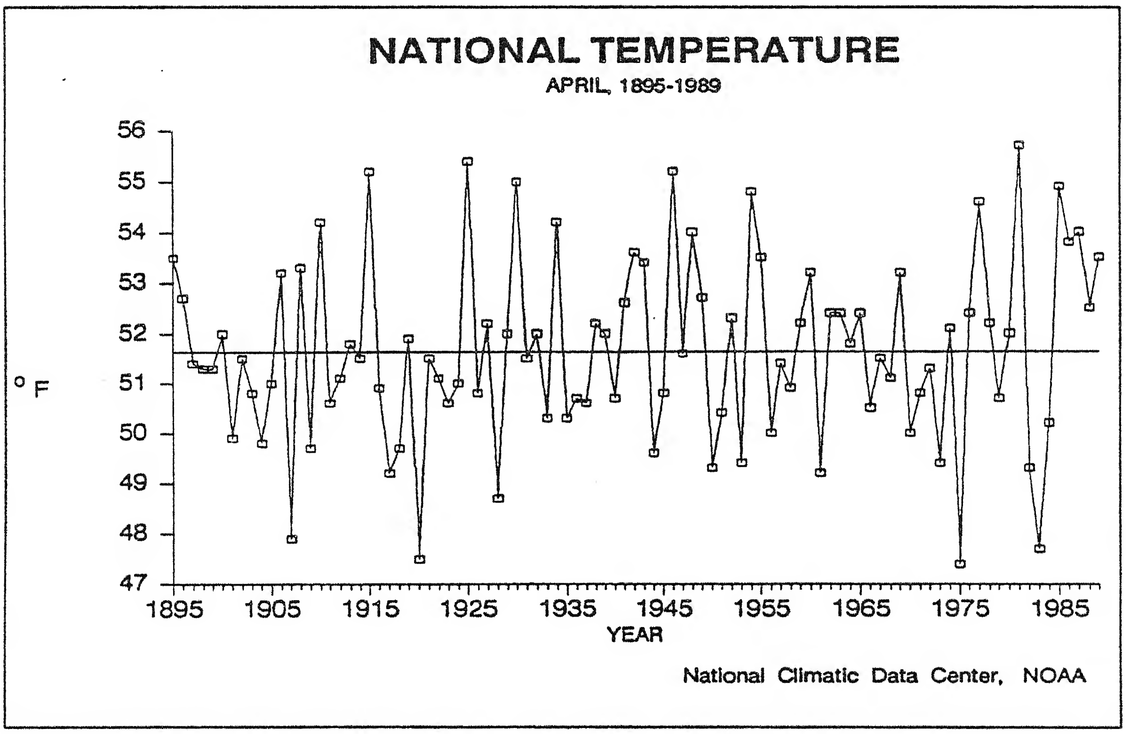
STATION	AVERAGE (°F)	NORMAL (°F)	DEPARTURE (°F)	RECORD TYPE	RECORDS BEGAN
Phoenix, AZ	80.1	68.0	+12.1	HIGHEST	1877
Las Vegas, NV	72.7	63.5	+10.4	HIGHEST	1937
Tucson, AZ	73.8	64.9	+8.8	HIGHEST	1947
Yuma, AZ	79.0	70.7	+8.3	HIGHEST	1878
Ely, NV	48.9	41.0	+7.9	HIGHEST	1947
Fresno, CA	67.3	60.1	+7.2	HIGHEST	1947
Medford, OR	57.4	50.4	+7.0	HIGHEST	1947
Northway, AK	34.9	28.0	+6.9	HIGHEST	1942
Bakersfield, CA	68.7	62.6	+6.1	HIGHEST	1947
San Francisco, CA	60.8	54.9	+5.9	HIGHEST	1851
Eugene, OR	55.6	49.6	+5.9	HIGHEST	1951
Salem, OR	54.7	48.9	+5.8	HIGHEST	1951
O	57.0	51.4	+5.6	HIGHEST	1947
	50.6	45.7	+4.9	HIGHEST	1966
	53.4	48.7	+4.7	HIGHEST	1947
	40.6	36.3	+4.2	HIGHEST	1942
	51.4	47.7	+3.8	HIGHEST	1953
	51.1	47.3	+3.8	HIGHEST	1951

TABLE 7. RECORD APRIL EXTREME TEMPERATURES.

STATION	EXTREME (°F)	DATE	RECORD TYPE	RECORDS BEGAN
Yuma, AZ	109	6 APR 89	HIGHEST	1949
Phoenix, AZ	105	20 APR 89	HIGHEST	1938
Tucson, AZ	104	21 APR 89	HIGHEST	1940
Los Angeles, CA	102	6 APR 89	HIGHEST	1936
Midland, TX	101	21 APR 89	HIGHEST	1949
Lubbock, TX	100	22 APR 89	HIGHEST	1949
Dodge City, KS	100	22 APR 89	HIGHEST	1941
Roswell, NM	99	21 APR 89	HIGHEST	1973
El Paso, TX	98	21 APR 89	HIGHEST	1939
Amarillo, TX	98	22 APR 89	HIGHEST	1941
Concordia, KS	98	26 APR 89	HIGHEST	1963
San Diego, CA	98	6 APR 89	HIGHEST	1940
Lincoln, NE	97	26 APR 89	HIGHEST	1971
Goodland, KS	96	22 APR 89	HIGHEST	1921
Grand Island, NE	96	26 APR 89	HIGHEST	1939
Omaha, NE	96	22 APR 89	HIGHEST	1936
Valentine, NE	96	22 APR 89	HIGHEST	1956
Dallas/Fort Worth, TX	95	3 APR 89	HIGHEST	1953
Norfolk, NE	95	22 APR 89	HIGHEST	1946
Charleston, SC	94	27 APR 89	HIGHEST	1943
St. Louis, MO	93	26 APR 89	HIGHEST	1958
Rapid City, SD	93	22 APR 89	HIGHEST	1943
San Francisco, CA	92	8 APR 89	HIGHEST	1928
Scottsbluff, NE	92	21 APR 89	HIGHEST	1943
Nashville, TN	91	27 APR 89	HIGHEST	1941
Evansville, IN	91	27 APR 89	HIGHEST	1940
Albuquerque, NM	89	21 APR 89	HIGHEST	1940
Denver, CO	89	21 APR 89	HIGHEST	1935
Grand Junction, CO	85	21 APR 89	HIGHEST	1946
Salt Lake City, UT	85	20 APR 89	HIGHEST	1929
Casper, WY	83	21 APR 89	HIGHEST	1950
Lander, WY	82	21 APR 89	HIGHEST	1947
Ely, NV	81	18 APR 89	HIGHEST	1939
Eureka, CA	80	9 APR 89	HIGHEST	1911
Shreveport, LA	31	11 APR 89	LOWEST	1953
Dallas/Fort Worth, TX	29	11 APR 89	LOWEST	1953



National average precipitation (inches) and average temperature (°F) for April 1989 obtained from the NOAA's National Climatic Data Center (NCDC). The nationally averaged precipitation (top) and temperature (bottom) were the third driest and fifteenth warmest since 1895, respectively.



The data are obtained from NCDC's cooperative data network. Individual stations are grouped into state climate divisions (344 in the contiguous U.S.) and an average monthly temperature and total precipitation value is calculated. An average state value is then determined for precipitation and temperature from the climate division values and are area-weighted. A national average for both temperature and precipitation is taken from these area-weighted state values and compared during the past 95 years (since 1895). Some climate division boundaries were different before 1931, but an algorithm was developed to compensate for the discrepancy. The number of cooperative stations has increased from approximately 500 in 1895 to nearly 8000 in 1989. The average (mean) value is depicted in each graph and incorporates the entire time preiod (95 years).

SPECIAL CLIMATE SUMMARY

Climate Analysis Center, NMC

National Weather Service, NOAA

LONG-TERM DRYNESS DEVELOPING ACROSS THE NEAR MIDDLE EAST

Since January 1, most of Turkey and adjacent portions of Syria, Greece, Georgian S.S.R., and Armenian S.S.R. have received sub-normal precipitation. This is a significant contrast from the last three months of 1988 when most of the region recorded above-normal amounts (see Figure 1). Relative to normal, the wettest area was located in north-central Turkey east of Ankara where up to 264% of normal precipitation was observed. The only areas the measured below normal amounts were located in the following regions: northern Syria into extreme southeastern Turkey; eastern Turkey to Armenian S.S.R. and Georgian S.S.R.; and, an area centered over the Aegean Sea that included southwestern Turkey, eastern and southern Greece and extended into Bulgaria and Yugoslavia.

Since then, meager precipitation amounts have fallen over central portions of Turkey and northern Syria where less than 50 mm has been observed since January 1 (see Figure 2). Northern and southern areas of Turkey received between 100 mm and 200 mm with amounts up to 300 mm reported along the Mediterranean Sea. Even with precipitation totaling upwards of 300 mm in Georgian S.S.R., cumulative amounts were below normal across the entire region with the exception of one isolated location in the USSR (see Figure 3). The western two-thirds of Turkey, Greece, and most of Armenian S.S.R. have received less than 1/2 of normal while northern Syria has measured less than 1/4 of normal precipitation for the year to date.

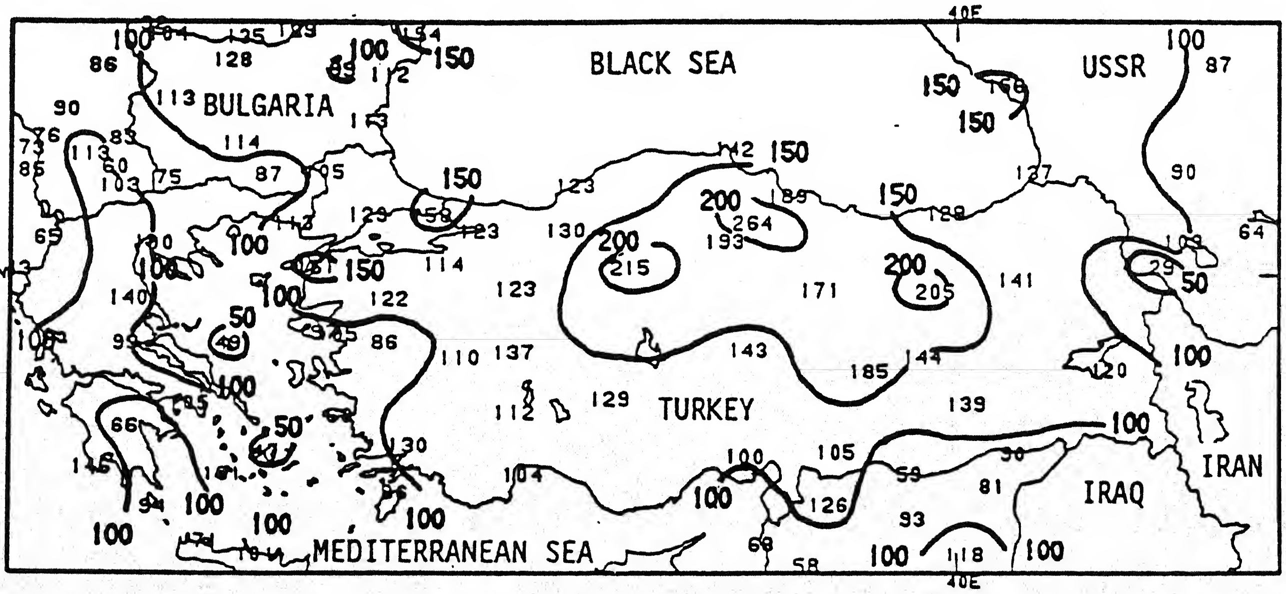


FIGURE 1. Percent of normal precipitation from Oct. 1 to Dec. 31, 1988 (92 days). Ninety percent (83 days) or more of the days were required for inclusion. Isopleths are drawn only for 50, 100, 150 and 200%.

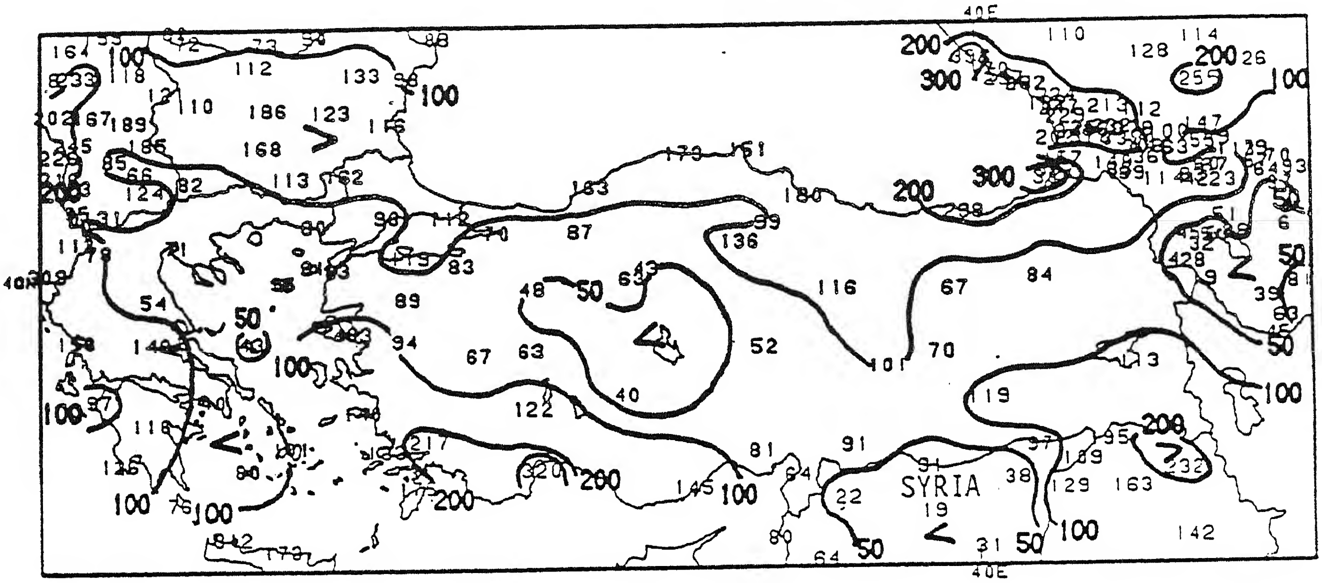


FIGURE 2. Total precipitation (mm) from Jan. 1 to May 6, 1989 (126 days). Ninety percent (114 days) or more of the days were required for inclusion. Isopleths are drawn only for 50, 100, 200, and 300 mm.

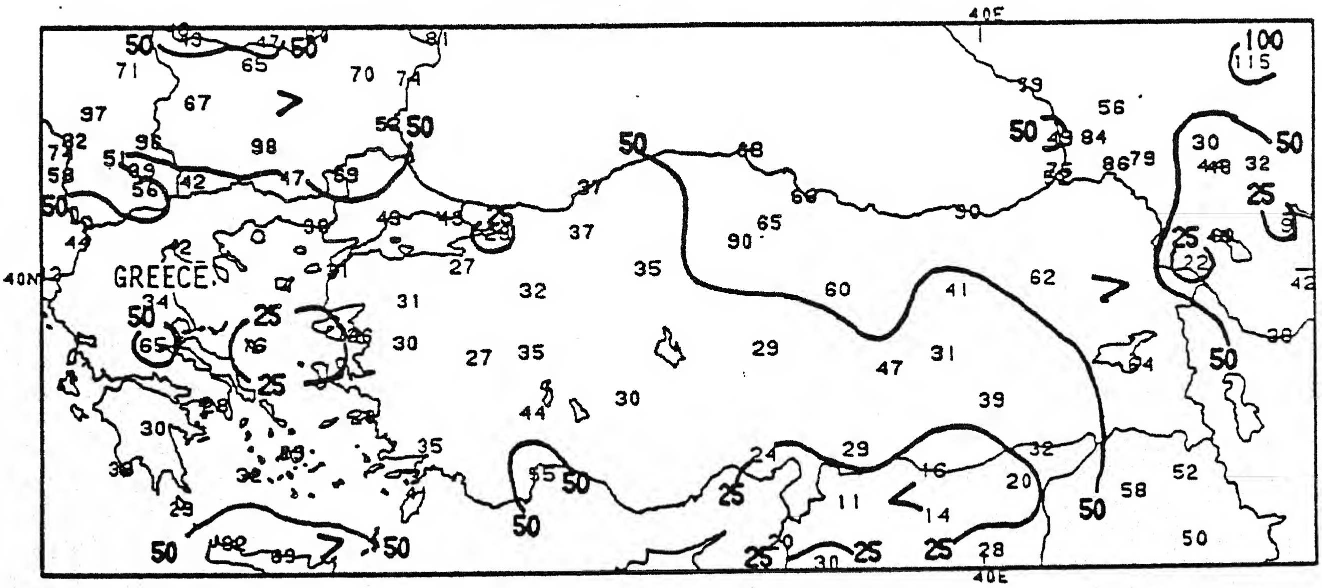


FIGURE 3. Percent of normal precipitation from Jan. 1 to May 6, 1989 (126 days). Ninety percent (114 days) or more of the days were required for inclusion. Isopleths are drawn only for 25, 50, and 100%.

The most extreme precipitation deficits exist in southwestern Turkey where totals since January 1 are between 300 mm and 400 mm below normal (see Figure 4). Elsewhere, departures in Turkey range from 200 mm in the northeast to near 50mm in eastern portions. Locations in the countries adjacent to Turkey have accumulated precipitation deficits of between 100 mm and 200 mm. Since normal precipitation amounts across the region generally decrease during the summer months, the likelihood exists that these departures will continue.

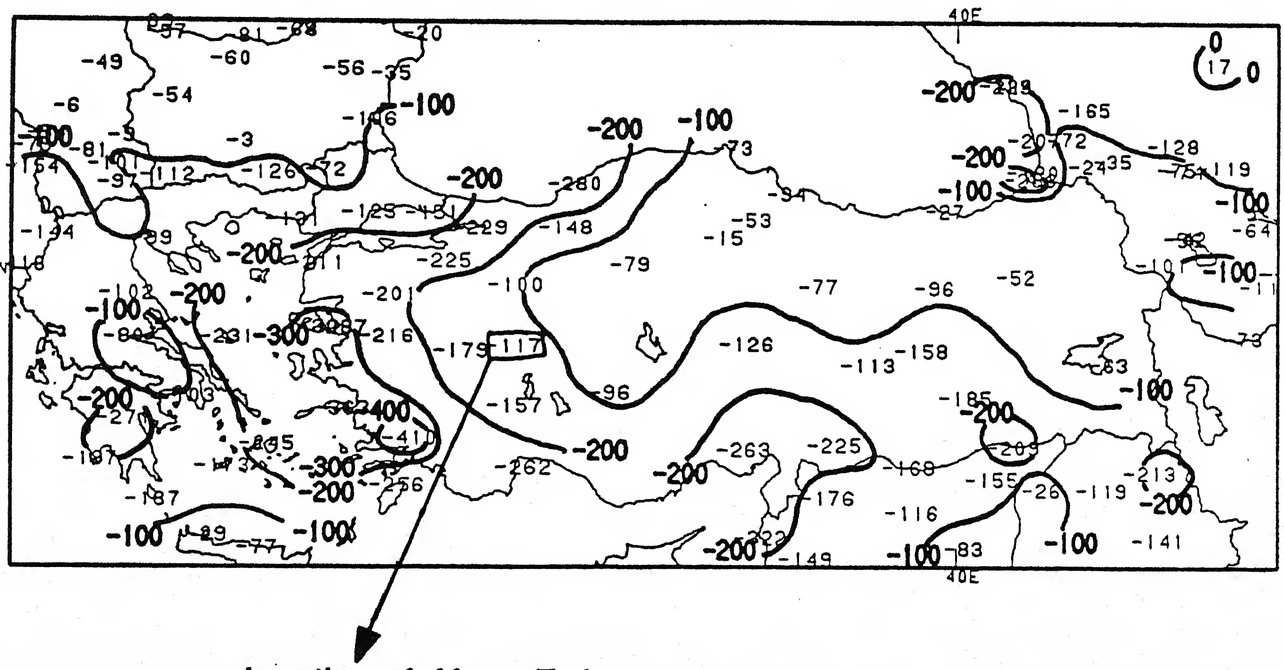


FIGURE 4. Departure from normal precipitation (mm) from Jan. 1 to May 6, 1989 (126 days). Ninety percent (114 days) or more of the days were required for inclusion. Isopleths are drawn only for 0, -100, -200, -300, and -400 mm.

At eight stations in Turkey, January through April of 1989 was driest on record since 1951. The precipitation time series for Afyon in west-central Turkey (station location noted in Figure 4) illustrates the severity of the dryness (see Figure 5). Previous to 1989, the driest January through April period was observed in 1973 when only 100 mm of precipitation was recorded. In a normal year, Afyon would receive 170 mm during this 4-month period. In 1989, however, only 43 mm of precipitation has fallen.

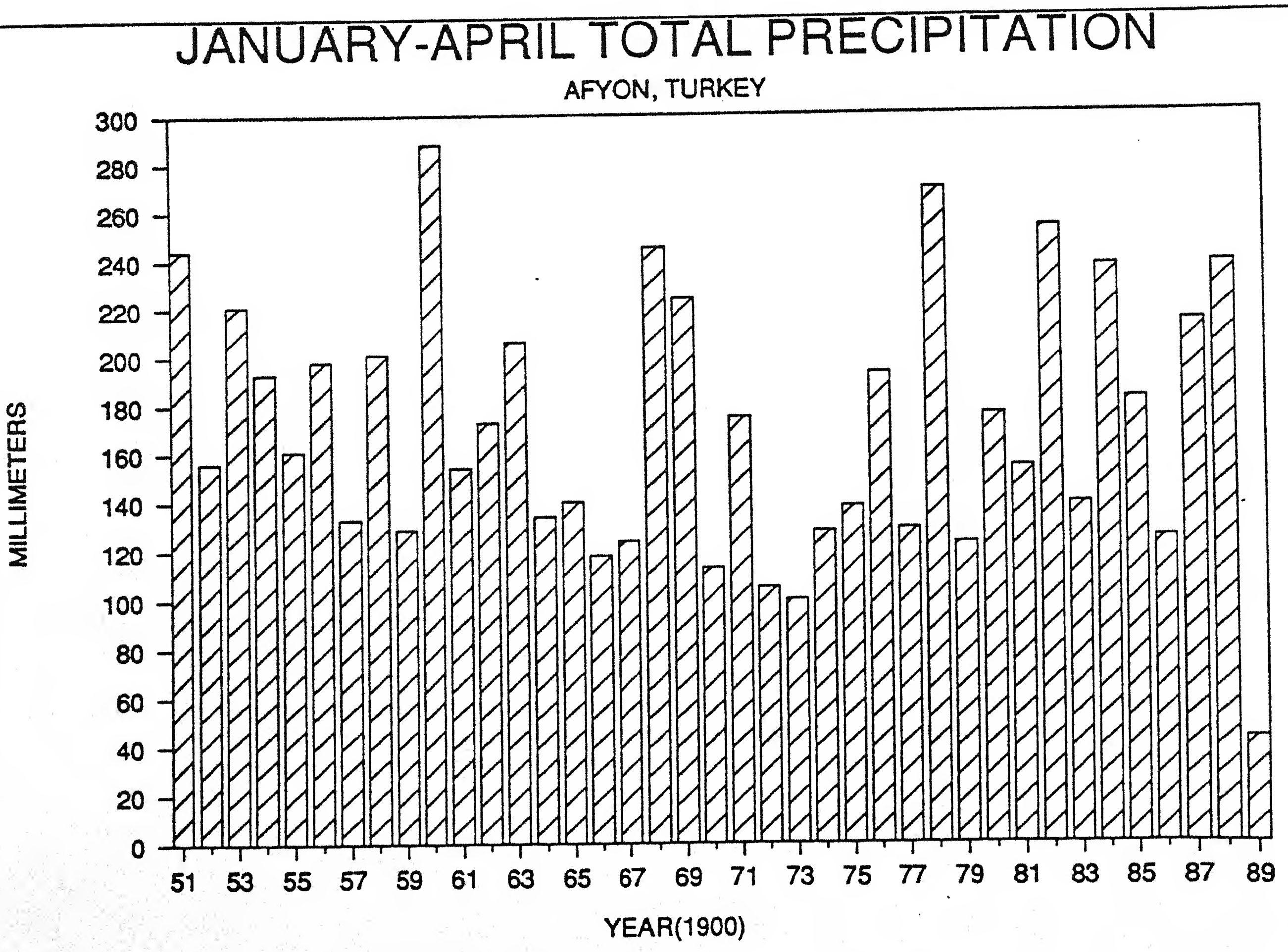


Figure 5. January through April cumulative precipitation (mm) for each year between 1951 and 1989 at Afyon, Turkey (see Figure 4 for station location).